Draft

Environmental Assessment for Modification and Addition of Evers Military Operations Area

District of Columbia Air National Guard

113th Wing, Joint Base Andrews, MD

April 2020

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ENVIRONMENTAL ASSESSMENT FOR MODIFICATION AND ADDITION OF EVERS MILITARY OPERATIONS AREA

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ACRONYMS AND ABBREVIATIONS

%HA	Percent Highly Annoyed
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
AFI	Air Force Instruction
AGL	above ground level
AHAS	Avian Hazard Advisory System
AI	Air Interdiction
ANG	Air National Guard
APE	area of potential effect
ARTCC	Air Route Traffic Control Center
AS	airlift squadron
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspaces
BAM	Bird Avoidance Model
BASH	Bird Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
CAS	Close Air Support
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CKB	Clarksburg Approach Control
CMR	combat mission ready
COA	Certificate of Waivers or Authorization
CSAR	Combat Search and Rescue
dB	decibels
dBA	A-weighted decibels
DCA	Defensive Counter Air
DCANG	District of Columbia Air National Guard
DNL	day-night Sound Level
DOD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAC-A	Forward Air Control-Airborne
FL	flight level
FONSI	finding of no significant impact
FR	Federal Register
FS	Fighter Squadron
ft	feet
GBO	Green Bank Observatory
IFR	Instrument Flight Rules
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
ILS	Instrument Landing System
IR	Instrument Route
Leq	Equivalent Sound Level

Lmax	Maximum Sound Level
LOWAT	low altitude
LWB	Lewisburg Approach Control
MACA	Mid-Air Collision and Avoidance
MNF	Monongahela National Forest
MOA	Military Operations Area
MSL	mean sea level
MTR	military training route
NAS	National Airspace System
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NM	nautical mile
NOTAM	Notice to Airmen
NRHP	National Register of Historic Places
NRQZ	National Radio Quiet Zone
OSHA	Occupational Safety & Health Administration
OCA-AO	Offensive Counter Air – Attack Operations
PDARS	Performance Data and Reporting System
RA	Restricted Area
RAP	Ready Aircrew Program
RNAV	Area Navigation
ROI	Region of Influence
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
SM	square mile
SR	Slow Route
SUA	Special Use Airspace
tpy	tons per year
U.S.	United States
USAF	United States Air Force
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VFR	Visual Flight Rules
VICC	Virginia Interagency Coordination Center
VMC	visual meteorological conditions
VR	Visual Route
WG	Wing
ZDC	Washington DC Center
ZID	Indianapolis Center
ZOB	Cleveland Center

1.0 INTRODUCTION

The Air National Guard (ANG) has prepared this Environmental Assessment (EA) to consider the potential consequences to the human and natural environment associated with the modification, expansion, and utilization of the Evers Military Operations Area (MOA) to accommodate the training requirements of the 113th Wing (WG). The ANG is a Directorate within the National Guard Bureau (NGB). The ANG Director assists the Chief NGB to carry out the functions of the NGB as they relate to the national defense directives of the United States (U.S.) (Department of Defense [DOD] 2015).

The ANG has prepared this EA pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] 4321–4347), Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] §§ 1500–1508), and the Environmental Impact Analysis Process (EIAP) (32 CFR §989, formerly promulgated as Air Force Instruction [AFI] 32-7061). This EA also identifies applicable management actions and best management practices that would avoid or minimize effects relevant to the Proposed Action.

As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project and be available to inform decision-makers of the potential environmental effects of selecting the Proposed Action, reasonable alternatives, or No Action Alternative.

1.1 BACKGROUND AND LOCATION

The 113 WG, District of Columbia Air National Guard (DCANG) is located at Joint Base Andrews, Maryland. The 113 WG is the air component of the DCANG and is the only federal National Guard unit. The federal mission of the 113 WG is to maintain combat forces ready for mobilization, deployment and employment as needed to support national security objectives. The mission during peacetime has the combat-ready unit assigned to the Air Combat Command (ACC) to carry out missions compatible with training, mobilization readiness, humanitarian and contingency operations such as Operation Enduring Freedom and Inherent Resolve. The District's mission includes defending the National Capital Region, providing support to the District of Columbia and local communities, providing emergency relief support, and providing support for other contingency operations.

The existing Evers MOA is above West Virginia and Virginia (Figure 1-1). Part of the MOA is above Highland County, Virginia and the remainder of the MOA is in Pocahontas, Pendleton, and Randolph counties, West Virginia. The airspace begins at 1,000 feet (ft) above ground level (AGL) and continues to 17,999 ft above mean sea level (MSL).

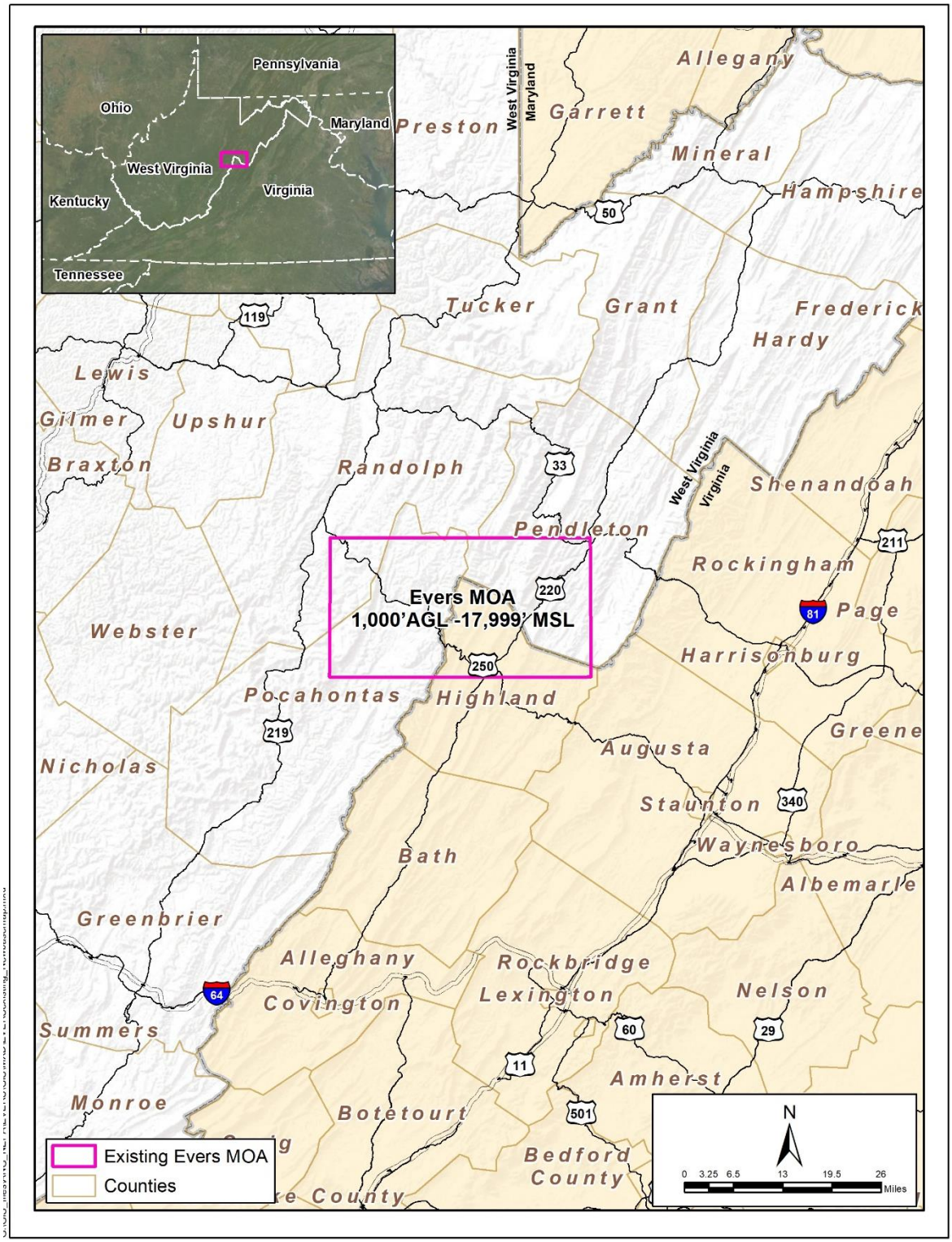
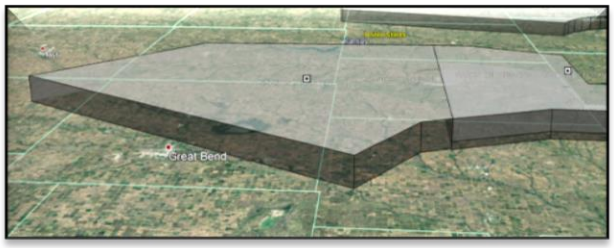


Figure 1-1. Existing Evers MOA

The proposed Evers MOA Complex would be an expansion and modification of the existing airspace and is described in detail in Section 2.

1.2 SPECIAL USE AIRSPACE OVERVIEW

The Federal Aviation Administration (FAA) Pilot's Handbook of Aeronautical Knowledge, Chapter 15 *Airspace*[1] identifies four types of airspace in the National Airspace System (NAS): controlled, uncontrolled, special use, and other. These types of airspace are defined by the complexity or density of aircraft movements, nature of the operations conducted within the airspace, the level of safety required, and national and public interest. The primary focus of this EA is on Special Use Airspace (SUA), specifically MOAs. SUA is the designation for airspace in which certain activities must be confined, or where limitations may be imposed on aircraft operations that are not part of those activities. Certain SUA areas can create limitations on the mixed use of airspace. Section 3.1 *Airspace Management* describes airspace in detail.



MOAs consist of three-dimensional airspace with defined vertical and lateral limits. MOAs are established for separating certain military activities from civilian aircraft being operated under Instrument Flight Rules (IFR). Aircraft operated under IFR are operating with a clearance and under positive control of the FAA Air Traffic Control (ATC). MOAs are depicted graphically on FAA sectional charts. Additional MOA information provided on the chart consists of upper limit elevation, lower limit elevation, activation method, hours of activation, controlling agency, and the using agency.

Civilian aircraft operating under IFR are allowed to fly through active MOAs. ATC may clear IFR traffic through an active MOA, if minimum IFR separation distances can be provided by ATC. If separation distances cannot be maintained, ATC will reroute or restrict IFR traffic from entering the active MOA.

Civilian aircraft may also operate under Visual Flight Rules (VFR). These aircraft are being operated using outside visual references for navigation, weather avoidance, traffic separation, and obstruction clearances. VFR aircraft are not under positive control by ATC, nor are they required to establish two-way communication with ATC. However, VFR aircraft may also fly through active MOAs. Because aircraft under VFR are not required to be in constant communication with ATC, pilots should exercise increased vigilance, or request ATC flight-following service, due to

[1] Source: FAA Pilot's Handbook of Aeronautical Knowledge, Chapter 15 *Airspace*
https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf

unusual or dangerous activity that might be occurring. ATC flight-following services are provided to requesting pilots on an ATC workload permitting basis. Flight-following services will assist VFR aircraft flying through the MOA by identifying potential conflicting traffic to the pilot.

1.3 PURPOSE AND NEED

The purpose of the action is to expand the Evers MOA laterally and vertically to train and prepare military pilots and aircrews for current and future conflicts. The action provides reasonable flexibility for aircrew usage and ATC de-confliction. Larger training airspace than the current confines of the Evers MOA is required for the diverse training mission sets. Current world conflicts have kept the F-16C in constant demand, but the amount of usable airspace to meet current training requirements has decreased (see Section 2.0).

The need for the action is to accommodate 113 WG training requirements for a reliable and realistic training environment in which to conduct upgrades and continuation training for aircrews. The restricted areas (RAs), warning areas, and military training routes (MTRs) that have been used in the past to accomplish training requirements have become increasingly unavailable to the 113 WG in recent years, resulting in training shortfalls due to ever tightening airspace limitations. Training shortfalls result from not having the availability of a spatially viable combat training environment to qualify and maintain aircrew capabilities, preserve readiness, and ultimately achieve our national objectives. Specifically, to meet the purpose and need the Proposed Action must (1) be within a reasonable distance (200 miles) of the primary end-user; (2) provide adequate size and shape for both air-to-air and air-to-ground training (i.e., 40 x 80 nautical miles [NM]); (3) adequate timing and capacity availability to the primary end-user; and (4) be controlled by a single FAA Air Route Traffic Control Center (ARTCC). The 40 x 80 NM size is necessary for air-to-air training; it allows for a 55 NM minimum intercept range (driven by expected enemy radar contact ranges and current missile kinematic capabilities), as well as an extra 25 NM total for a marshalling/holding area. Additionally, the 40 x 80 NM size allows for wider range of attack into the target area for simulated ground training. Any less than 40 NM in width does not allow for realistic ingress/egress maneuvering for simulated air-to-ground missions. The requested size also allows for multiple areas of operation for close air support missions.

The 113 WG maintains 30 combat mission ready (CMR) pilots in a combination of 24 experienced and six inexperienced aviators. This mix is important to the calculation of CMR Ready Aircrew Program (RAP) sortie and event requirements, which are higher for inexperienced pilots and impact shortfall numbers. F-16C pilots must be able to train effectively and accurately by simulating all types of weapons across many mission sets. Considering a notional air-to-air intercept timeline of the F-16C and realistic surface attack/close air support scenario, 80 x 40 NM represents the minimum lateral airspace required to effectively train to the 113 WG's widely varying missions. Moreover, due to the F-16C's air-to-ground utility, low altitude (LOWAT)

airspace is essential for maintaining currency and proficiency to execute safe and effective combat operations.

To meet the RAP tasking requirements, the 113 WG must fly 2,144 annual training sorties, which includes air-to-air sorties that can be conducted over water. The surface attack mission requirement for 30 CMR pilots is 968, which is the number of air-to-ground training sorties required to be over land. In addition, the RAP requires 30 CMR pilots to accomplish 960 individual training events that need to be accomplished over land (most of these events can only be accomplished once per sortie). The RAP requires 1,440 simulated weapons employment events, which also need to be conducted over land. The 968 training sorties are used to conduct both the 960 over land training events, and the 1,440 weapons employment events. Thus, the proposed Evers MOAs are essential to accomplishing the 968 overland training sorties and provide a preferred option for all 2,144 total training sorties (which includes air-to-air requirements that do not necessarily have to be accomplished over land).

This EA uses sortie, operation, and event to describe different components of aircraft flying activities as follows:

Sortie: a single military aircraft flight from take-off through final landing. A sortie can include more than one operation.

Operation: regarding airspace, an operation is the use of one airspace unit (e.g., MOA) by one aircraft. Each time a single aircraft flies in a different airspace unit, one operation is counted toward the utilization of that airspace unit.

Event: specific training element (e.g., supersonic flight). More than one event may be performed during the use of an airspace unit. During a single sortie, aircraft could fly in several airspace units, conduct several operations, and events.

The primary drivers of airspace shape, size, and feature requirements are the F-16C RAP Tasking Memorandum, in conjunction with AFI 11-2F-16V1 that outlines the continuing training program for ACC units. These requirements define the minimum number and type of annual sorties, simulator missions and specific training events specialized aircrews must accomplish to sustain CMR. Per AFI 11-2F-16V1, an effective RAP mission requires accomplishment of a complete tactical scenario or a basic skills mission.

Due to the F-16C's air-to-ground utility, LOWAT airspace is essential for maintaining currency and proficiency to execute safe and effective combat operations. Additionally, the existing Evers MOA is too small for air refueling operations, which have become a critical training multiplier. The proposed expansion and modification of the Evers MOA could accommodate air-to-air refueling. The creation of three Air Traffic Control Assigned Airspaces (ATCAAs) over the proposed MOA expansion and modification would provide a vertical airspace that effectively doubles the opportunities for full spectrum tactical training. The 113 WG requires access to airspace that provides a spatially viable combat training environment to qualify and maintain aircrew capabilities, preserve readiness, and ultimately achieve our national policy objectives. Failure to create the minimum lateral airspace for 113 WG missions will result in training shortfalls and negatively impact combat readiness and pilot safety. Training shortfalls result from not having

the availability of a spatially viable combat training environment to qualify and maintain aircrew capabilities, preserve readiness, and ultimately achieve our national objectives. The 113 WG cannot effectively train to realistic threat or target scenarios in the currently available Evers MOA airspace (16 x 30 NM).

1.4 SUMMARY OF ENVIRONMENTAL STUDY REQUIREMENTS

1.4.1 National Environmental Policy Act

NEPA and CEQ regulations (40 CFR §§ 1500 through 1508) require federal agencies to analyze the potential environmental impacts of Proposed Actions and alternatives and use those analyses in making decisions on whether and how to proceed with those actions. These regulations specify that an EA be prepared to (1) provide sufficient analysis and evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a finding of no significant impact (FONSI); (2) aid in an agency's compliance with NEPA when an EIS is not necessary; and (3) facilitate preparation of an EIS when necessary.

The EIAP is the United States Air Force's (USAF's) process for conducting environmental impact analyses, as promulgated at 32 CFR §989. To comply with NEPA and complete the EIAP, CEQ regulations and the EIAP are used together. To comply with NEPA and other relevant environmental requirements (e.g., the National Historic Preservation Act [NHPA], Endangered Species Act [ESA], etc.) and to assess potential environmental impacts, the EIAP and decision-making process for the Proposed Action involves a study and examination of all environmental issues pertinent to the proposed modifications and additions to the Evers MOA, in the form of this EA.

Although the Secretary of the Air Force or their designated representative will decide whether to implement the Proposed Action, the FAA has final authority for approving or denying any proposal to modify, expand, or establish SUA (e.g., MOAs, ATCAAs, and RAs).

1.4.2 Lead and Cooperating Agencies

The NGB is the lead agency for this EA pursuant to 40 CFR §1501.5 and §1508.5. Since the Proposed Action includes activities associated with SUA, NGB requested and received the FAA cooperation in accordance with the guidelines described in the Memorandum of Understanding between FAA and DOD concerning SUA actions, dated 4 October 2005 (Appendix 7 updated in October 2019). The ANG requested that the FAA participate as a cooperating agency in various portions of the EA development, including (1) early review of the Proposed Action and Draft EA; (2) assuming responsibility, upon request, for developing information and preparing analyses on issues for which FAA personnel have special expertise; and (3) making FAA staff support available to enhance interdisciplinary review capabilities. Details regarding the process of

interaction between the ANG and FAA are described further in Appendix A, *Agency and Public Coordination* within the cooperating agency letter.

1.4.3 Federal Aviation Administration Guidelines

The FAA is responsible for managing navigable airspace for public safety and ensuring efficient use for commercial air traffic, general aviation, and national defense, including SUA utilized by the DOD. Consequently, the FAA is the final decision-making authority regarding modification or establishment of airspace. FAA Order JO 7400.2M (FAA 2019a), Procedures for Handling Airspace Matters provides guidance to air traffic personnel to assist in applying the requirements in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, to air traffic actions. FAA Order 1050.1F provides the FAA with policies and procedures to ensure agency compliance with NEPA and implementing regulations issued by the CEQ (40 CFR §1500-1508). Order 1050.1F identifies impact categories to be considered during the NEPA process. Sections 1.5 and 1.6 contain a list of each of the resources as prescribed by FAA Order 1050.1F, the associated sections within this EA where each is discussed, or the reason for excluding it from detailed analysis.

FAA Order 1050.1F defines the thresholds for “significant” noise impacts (Exhibit 4-1) and the thresholds for “reportable” noise impacts (Appendix B-1.4). To make certain the ANG is meeting FAA requirements, during the release and transmittal of the Draft EA, the ANG will "report" the greater than 5 dBA day-night Sound Level (DNL) increase pertaining to 45-60 DNL to interested parties. In addition, the ANG will include a brief discussion to outline that, as described above, changes in overall noise levels would only introduce a minute incremental changes in the percent highly annoyed for areas under the proposed Evers Low MOA, as the noise in such areas would not normally solicit complaints and noise would be "essentially the least important of various factors" in these areas. In addition, the ANG will outline that the change in noise under the Proposed Action would decrease noise levels by 2.6 to 7.8 dBA DNL throughout 634 square miles (SM) and for individuals beneath the existing Evers MOA.

1.4.4 Interagency and Intergovernmental Coordination for Environmental Planning and Public Involvement

Through the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), the ANG provides opportunities for the public to participate in the NEPA process to promote open communication and improve their decision-making process. All persons and organizations identified as having potential interest in the Proposed Action are encouraged to participate in the process.

Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, requires intergovernmental notifications prior to making any detailed statement of environmental effects. NEPA, 40 CFR §§1500-1508, and 32 CFR §989 requires public review of the EA before approval

of the FONSI and implementation of the Proposed Action. Through the IICEP process, the ANG notified relevant federal, state, and local agencies and allowed them 30 days to make known their environmental concerns specific to the Proposed Action. Similarly, consultation letters were sent to the federally recognized tribes to provide notification of the action and to initiate government-to-government consultation in accordance with Section 106 of the NHPA, *Agency and Public Coordination*. Tribal coordination was done through certified mail; follow-up phone calls to tribal recipients were conducted at 2 weeks and at 2 months after receipt verification to ask if there are any questions or concerns regarding the Proposed Action. Comments and concerns submitted by these agencies are subsequently incorporated into the analysis of potential environmental impacts conducted as part of the EA. A Notice of Availability for public review of the Draft EA was published in the following newspapers on ___ 2020 and ___2020:

- Inter-Mountain, Elkins, WV;
- The Recorder, Monterey, VA;
- Pocahontas Times, Marlinton, WV; and
- West Virginia Daily News and Greenbrier Valley Ranger, Lewisburg, WV.

The Draft EA was made available for public review at the following libraries:

- Elkins-Randolph County Library, Elkins, WV;
- Highland County Public Library, Monterey, VA;
- Pocahontas County Library, Marlinton, WV; and
- Greenbrier County Public Library, Lewisburg, WV.

The Draft EA will be made available and distributed upon request to federal, state, and local agencies as well as regional libraries to invite public participation. More information is available on the 113 WG's webpage at www.113wg.ang.af.mil/EversMOA. Copies of all correspondence are provided in Appendix A. The following is a sample of the agencies that were provided an opportunity to comment on both the scope and analysis of the Draft EA:

- Aircraft Owners and Pilots Association
- Chamber of Commerce/Economic Development
- FAA
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Army Corps of Engineers
- United States Department of Agriculture (USDA), Natural Resources Conservation Service
- State Historic Preservation Office
- State Department of Natural Resources
- U.S. Forest Service–Monongahela, Washington, and Jefferson National Forests
- Green Bank Observatory

1.4.5 Cultural Resources

The NHPA of 1966 (54 U.S.C. § 300101 et seq.) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP). The ACHP was tasked with, and provided, procedures for the management of Historic Properties on federal land

(36 CFR §800). Historic Properties are generally defined as cultural resources, including archaeological remains, architecture, and traditional cultural places that are listed in or eligible for listing in the NRHP. Section 106 of the NHPA requires federal agencies to consider potential effects of their undertakings to Historic Properties, and requires the federal agency to consult with the appropriate State or Tribal Historic Preservation Office.

The Archaeological Resources Protection Act of 1979 (16 U.S.C. §§470aa-mm) was created to protect archaeological resources on public and Native American lands, and encourage cooperation and exchange of information between governmental authorities, professionals, and private individuals. The act establishes civil and criminal penalties for destruction and alteration of cultural resources.

The American Indian Religious Freedom Act (42 U.S.C. §1996) established federal policy to protect and preserve the rights of Native Americans to believe, express, and exercise their traditional religions, including providing access to sacred sites. In addition, EO 13175, *Consultation and Coordination with Indian Tribal Governments*, charges federal departments and agencies with regular and meaningful consultation with Native American tribal officials in the development of policies that have tribal implications.

1.4.6 Endangered Species Act

The ESA of 1973 (16 U.S.C. §§ 1531-1544, as amended) established measures for the protection of plant and animal species that are federally listed as threatened and endangered, and for the conservation of habitats that are critical to the continued existence of those species. Federal agencies must evaluate the effects of their Proposed Actions through a set of defined procedures, which may include the preparation of a Biological Assessment and can require formal consultation with the USFWS under Section 7 of the Act.

1.4.7 Other Executive Orders

EO 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects*, establishes the framework for the "One Federal Decision" framework for improving the environmental review process for major infrastructure projects and sets goals for federal agencies to reduce the average time for completing environmental impact statements and authorized decisions. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, provides that citizens in either of these categories are not disproportionately affected by a federal action. Additionally, potential health and safety effects that could disproportionately affect children are considered under the guidelines established by EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, acts as additional protection for migratory birds.

1.5 RESOURCES NOT CARRIED FORWARD FOR DETAILED ANALYSIS

The determination of issues to be analyzed versus those not carried forward for detailed analysis is part of the NEPA process as described in 40 CFR §1501.7(a) (3), which states that issues addressed in prior environmental reviews, or that are not potentially significant, may be eliminated from discussion in the EA. Several components of the Proposed Action naturally limit environmental effects. The Proposed Action would not include any infrastructure changes, construction, demolition, renovations, or ground-disturbing activities. The Proposed Action would not include supersonic flight activities, release of chaff and flares, or ordnance deployment. The following is a list of each of the resources as prescribed by FAA Order 1050.1F, which have not been carried forward in this EA and the reason for excluding it from detailed analysis.

Air Quality. U.S. Environmental Protection Agency (USEPA) has designated all counties beneath the proposed Evers MOA (i.e., Barbour, Braxton, Greenbrier, Harrison, Lewis, Nicholas, Pocahontas, Pendleton, Randolph, Tucker, Upshur, Webster, Alleghany, Bath, Botetourt, Highland) as full attainment for all criteria pollutants (USEPA 2018). Because all areas associated with the Proposed Action are in attainment, the General Conformity Rules do not apply and a Record of Non-applicability to the General Conformity Rule is in Appendix B. Although the general conformity rule would not apply, the Air Conformity Applicability Model was used to estimate the total direct and indirect emission from air operations within the proposed SUA, which have been compared to the *de minimis* (of minimal importance) thresholds to determine the level of effects under NEPA (Table 1-1) (USAF 2019a). Total emissions would be less than 10 percent of the *de minimis* threshold of 100 tons per year (tpy) of each pollutant and within an attainment area.

Table 1-1. Annual Air Emissions Compared to *De Minimis* Thresholds

	CO	NO_2	VOC	SO_2	PM_{10}	$PM_{2.5}$	*De minimis* Threshold (tpy)	Exceeds *De Minimis* Threshold? (Yes/No)
Aircraft Operations	3.7	5.8	2.5	0.6	1.4	1.2	100	No

Source: USAF 2019a. PM_{10} particulate matter 10 microns, $PM_{2.5}$ particulate matter 2.5 microns, SO_2 sulfur dioxide, NO_2 nitrogen dioxide, VOC volatile organic compound, CO carbon monoxide

The general conformity rule was established with NEPA in mind, and it is understood that actions of this size within a USEPA-designated attainment area would have negligible effects to air quality. Emission estimates in Table 1-1 include all air operations in the proposed Evers Low MOA (i.e., 1,000 ft AGL to 10,999 ft MSL). Emissions from aircraft operations above the mixing height of 3,000 ft AGL are known not to have effects to individuals on the ground and are not normally included in an applicability analysis under the general conformity rule (40 CFR §93.153 (c) (xxii)). However, this assessment conservatively includes these emissions, as well as all emissions within the proposed Evers Low MOA as a reasonable upper bound of effects. Actual emissions would be lower than those shown herein.

There would be no changes in personnel, no construction, and no changes in ground-based operations or training due to the Proposed Action. The Proposed Action would not include any new stationary sources of air emissions, and no air permits would be required. These effects would be negligible; therefore, air quality was not carried forward for detailed analysis in this EA.

Climate. The Proposed Action would have negligible effects on climate. There would be no changes in personnel, no construction, and no changes in ground-based operations or training due to the Proposed Action. The Proposed Action would not include any new stationary sources of air emissions. The ANG-wide training requirements would not change, and any increase in greenhouse gas emission from aircraft operations in the proposed airspace would be directly offset by reductions in emissions from the required training where it would otherwise be conducted. Climate would remain consistent with existing conditions. These effects would be negligible; therefore, climate was not carried forward for detailed analysis in this EA.

Coastal Resources. The proposed modifications and additions to the Evers MOA would not affect coastal resources located inland; therefore, Coastal Resources was not carried forward for detailed analysis in this EA.

Department of Transportation Act: Section 4(f). Section 4(f) of the U.S. DOT Act of 1966 (now codified at 49 U.S.C. § 303) protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites (FAA 2015). FAA Order 1050.1F prescribes that designation of airspace for military flight operations is exempt from Section 4(f) of the Department of Transportation Act. In addition, the DOD reauthorization in 1997 provided that "No military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303(c) of Title 49, U.S.C. (Public Law 105-85)." Therefore, this resource was not carried forward for detailed analysis in this EA.

Farmlands. Farmlands are defined as those agricultural areas considered important and protected by Federal, state, and local regulations. Important farmlands include all pasturelands, croplands, and forests (even if zoned for development) considered to be prime, unique, or of statewide or local importance (FAA 2015). The Proposed Action would have negligible effects to farmlands. There would be no short- or long-term changes in land use due to the Proposed Action. There would be no changes in personnel, no construction, and no changes in ground-based operations or training due to the Proposed Action. Proposed activities would not alter the current land use classifications, nor would they occur on farmlands. All land use would remain unchanged when compared to existing conditions. The effects would be negligible; therefore, Farmlands was not carried forward for detailed analysis in this EA. Noise from aircraft operations under the Proposed Action would not exceed 65 dBA DNL and would be compatible with all land uses, including farmlands. Effects on land use from noise is described in Section 3.2 of the EA.

Hazardous Materials, Solid Waste, and Pollution Prevention. No ground-disturbing activities (e.g., construction or demolition) would occur as a part of the Proposed Action. Consequently, there would be no increase in the temporary storage of construction-related materials and wastes. Therefore, no impacts associated with hazardous materials and wastes are anticipated. Military aircraft operating within the proposed airspace would continue to adhere to USAF fuel dumping procedures, when necessary (i.e., in life-threatening emergency situations). Fuel dumping is not a component of any routine flight training and only occurs during in-flight emergency circumstances with a loss of life potential for the pilot (FAA Order JO 7110.65U Section 4.10 Fuel Dumping). Fuel dump procedures would remain unchanged under the Proposed Action and fuel venting is highly unlikely to occur within the airspace. These effects would be negligible; therefore, Hazardous Materials, Solid Waste, and Pollution Prevention were not carried forward for detailed analysis in this EA.

Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks. The Proposed Action would have negligible effects on the local or regional socioeconomic environment. Establishment of the proposed Evers MOA expansion and modification would have no changes to socioeconomics or have any effects on environmental justice when compared to existing conditions. Table 1-2 outlines the total personal income, population, poverty level, and minority population for counties underlying the proposed Evers MOA (U.S. Bureau of Economic Analysis 2019).

Table 1-2. Socioeconomic and Environmental Justice Data

County	Total Personal Income*	Population	Poverty Level	Minority Population
Harrison, WV	$3,007,582.00	68,775	36%	5%
Lewis, WV	$584,861.00	16,442	43%	3%
Braxton, WV	$432,895.00	14,463	44%	3%
Nicholas, WV	$792,086.00	25,743	40%	3%
Barbour, WV	$502,693.00	16,892	45%	4%
Upshur, WV	$760,965.00	24,632	39%	4%
Webster, WV	$223,861.00	8,820	58%	0%
Greenbrier, WV	$1,278,836.00	35,580	41%	7%
Tucker, WV	$277,058.00	6,922	40%	2%
Randolph, WV	$1,009,637.00	29,287	40%	4%
Pocahontas, WV	$313,423.00	8,620	41%	4%
Bath, VA	$252,991.00	4,558	33%	8%
Pendleton, WV	$234,884.00	7,291	44%	5%
Highland, VA	$94,835.00	2,230	29%	0%
Alleghany, VA	$786,749.00	15,919	37%	8%
Botetourt, VA	$1,598,263.00	33,192	24%	7%
Virginia	$466,742.00	8,310,301	27%	37%
West Virginia	$69,872.70	1,846,092	39%	8%

*All county dollar estimates are in thousands of dollars and all state dollar estimates are in millions of dollars.

Source: EJSCREEN 2019 and U.S. Census Bureau 2019

Consideration of environmental justice and protection of children is to ensure that no group of people should bear a disproportionate share of the negative environmental consequences resulting

from federal actions. The threshold used for identifying minority and low-income were developed consistent with CEQ guidance (CEQ 1997a) for identifying minority populations. For this analysis, the significance thresholds for environmental justice concerns were established at the state level. For the analysis, counties are assumed to contain disproportionately high percentages of minority and/or low-income populations if the percentage of minority and/or low-income persons in the area significantly exceeds the state average (20 percentage points) or if the percentage of minority and/or low-income population exceeds 50 percent of the population. All counties in West Virginia except for Harrison and Upshur exceed the state poverty average for the state (39 percent), however, the other poverty levels are not "meaningfully greater" than the low-income population for the state. All counties in Virginia except for Botetourt exceed the state poverty average for the state (27 percent); however, the other county poverty levels are not "meaningfully greater" than the low-income population for the state. The Proposed Action is not expected to result in disproportionate negative environmental effects for low-income populations because no effects on sales volume, income, employment, or population would be expected. In addition, military airspace has not been shown to affect the economic values beneath it. There are no counties in West Virginia or Virginia that exceed the state minority average (8 percent and 37 percent, respectively). Data reviewed indicates that counties underlying the proposed Evers MOA expansion and modification do not present an above average presence of environmental justice populations.

There would be no effects on sales volume, income, employment, or population due to the Proposed Action. No effects to Socioeconomics, Environmental Justice, Environmental Health and Safety Risks would occur under the Proposed Action; therefore, these resource areas were not carried forward for detailed analysis in this EA.

Natural Resources and Energy Supply. The Proposed Action would not involve extractive activities or changes in the energy supply; therefore, Natural Resources and Energy Supply was not carried forward for detailed analysis in this EA.

Visual Effects. The Proposed Action would have negligible effects on visual features. There would be no construction or infrastructure development associated with the Proposed Action, and no changes to the visual or aesthetic characteristics of any area. Aircraft would not create condensation trails within the proposed Evers MOA, as the aircraft would not operate above 25,000 ft AGL the minimum altitude normally required to produce them. All existing visual features would remain consistent with existing conditions. These effects would be negligible; therefore, Visual Effects was not carried forward for detailed analysis in this EA.

Water Resources. No construction activities or other ground-based activities would occur under the Proposed Action, and its implementation would not cause any disturbance of surface water or groundwater resources; including wetlands, floodplains, surface waters, groundwater, or wild and scenic rivers. Therefore, Water Resources was not carried forward for detailed analysis in this EA.

1.6 RESOURCES CARRIED FORWARD FOR DETAILED ANALYSIS

As directed by guidelines in NEPA, CEQ regulations, and 32 CFR 989, the description of the affected environment focuses on those resource areas potentially subject to impacts and should be commensurate with the anticipated level of environmental impact. After preliminary analyses of resources as prescribed by FAA Order 1050.1F and other NGB requirements, the following resource areas will be carried forward for further analysis in the EA due to the potential for direct, indirect, or cumulative effects:

Airspace Management. Detailed descriptions of the affected environment and analysis of the environmental consequences associated with Airspace Management including airspace safety are in Section 3.1 of the EA.

Noise. Detailed descriptions of the affected environment and analysis of the environmental consequences associated with Noise are in Section 3.2 of the EA.

Biological Resources. Detailed descriptions of the affected environment and analysis of the environmental consequences associated with Biological Resources including Bird Aircraft Strike Hazard safety considerations are in Section 3.3 of the EA.

Cultural Resources. Detailed descriptions of the affected environment and analysis of the environmental consequences associated with Cultural Resources are in Section 3.4 of the EA.

Land Use. Detailed descriptions of the affected environment and analysis of the environmental consequences associated with Land Uses are in Section 3.5 of the EA.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This section presents a detailed description of the Proposed Action, including the requirement to provide an integrated, year-round, realistic training environment in accordance with F-16C RAP and AFI 11-2F-16V1 training requirements. The details of the Proposed Action form the basis for the analyses of potential environmental effects presented in Section 3 of the EA. This section includes a discussion of alternatives considered but dismissed from further analysis, as well as the No Action Alternative. No viable alternatives to the Proposed Action were identified.

2.1 SELECTION CRITERIA

The current airspace limitations of the Evers MOA impede efficient military aircraft exercises. To allow for the required exercises, the proposed airspace must be of sufficient, contiguous size and altitude to train and prepare military aircrews for current and future conflicts in a realistic training environment. In addition, the airspace must be within F-16C average sortie duration range to accomplish 113 WG training requirements. The selection criteria are summarized below.

- Must be within a reasonable distance (200 miles) of the primary end-user
- Must provide an adequate size and shape for both air-to-air and air-to-ground training (i.e., 40 x 80 NM)
- Must have adequate availability to the primary end-user
- Must be controlled by a single ARTCC

Without airspace that meets these selection criteria, exercising units would be severely constrained while trying to achieve their required training goals. Failure to create airspace of suitable dimensions will result in training shortfalls and negatively impact combat readiness and pilot safety. Training shortfalls result from not having the availability of a spatially viable combat training environment to qualify and maintain aircrew capabilities, preserve readiness, and ultimately achieve our national objectives.

2.2 PROPOSED ACTION

The proposed Evers MOA expansion and modification is in West Virginia and Virginia (Figures 2-1 and 2-2). The Proposed Action would expand beyond the lateral footprint of the current Evers MOA, subdivide this new airspace volume into five portions that increase Washington ARTCC's ability to accommodate civil operations, and establish three ATCAAs above the MOAs (Figure 2-2). The Evers East and Evers Low MOAs would be delineated within the existing Evers MOA. Notably, the northeast portion of the existing Evers MOA would no longer be under any MOA with the Proposed Action (Figure 2-1). The components of the Proposed Action include:

- Delineate new airspace
    - Evers North, Center and South MOAs (11,000 ft – 17,999 ft above MSL)

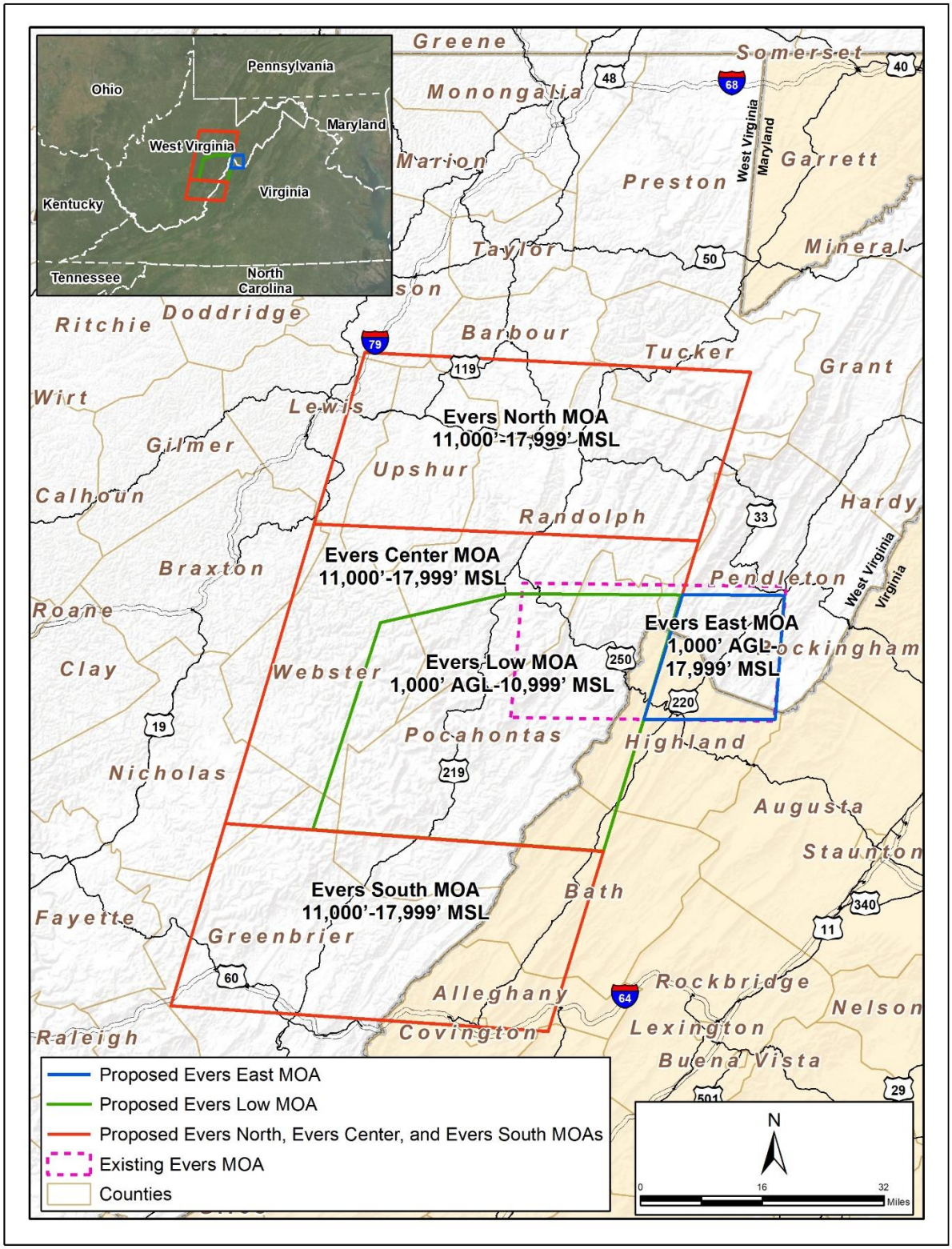


Figure 2-1. Proposed Evers MOA Complex

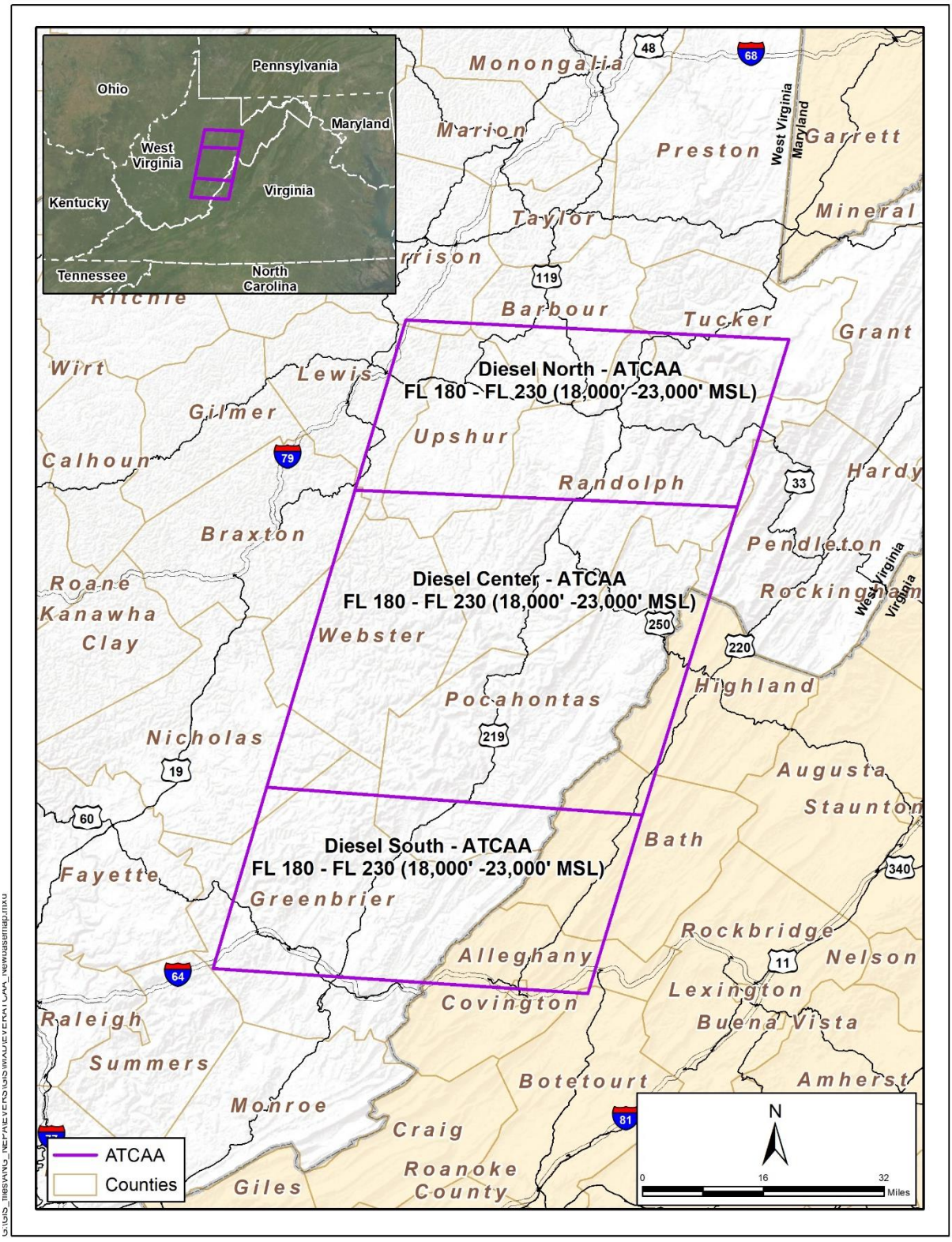
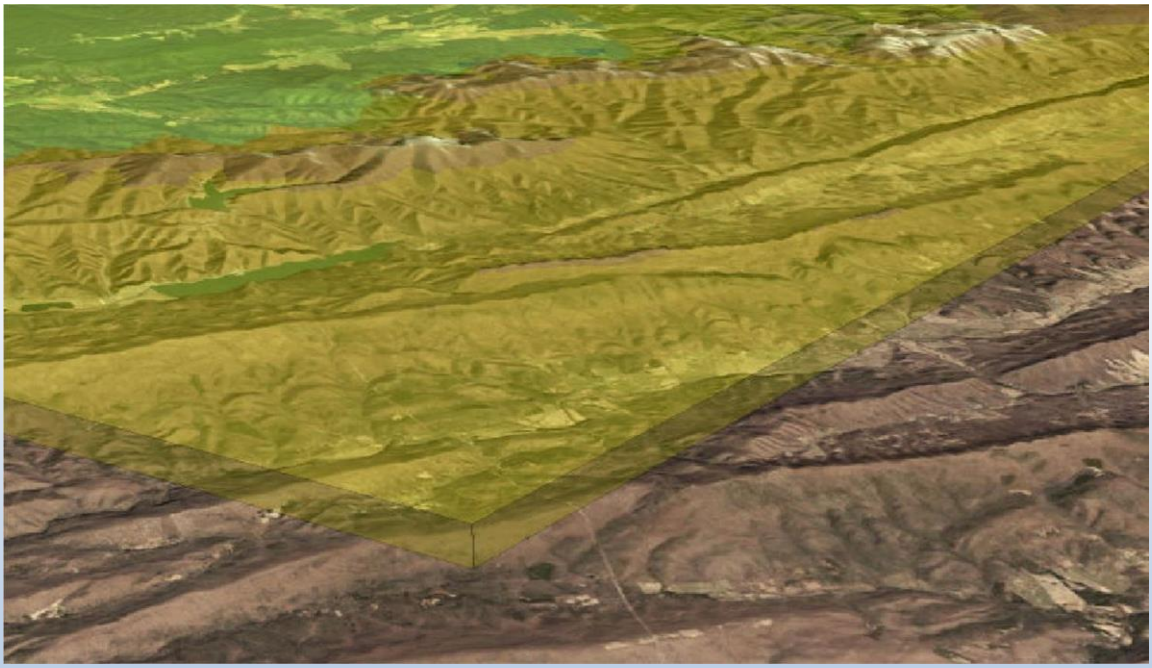


Figure 2-2. Proposed Air Traffic Controlled Assigned Airspaces

  - Evers Low MOA (1,000 ft AGL – 10,999 ft above MSL)
  - Evers East MOA (1,000 ft AGL – 17,999 ft above MSL)

- Create three ATCAAs
  - Diesel North, Center and South ATCAA (Flight Level [FL]180 – FL230 MSL)

The proposed Evers MOA Complex would occur over all or parts of the following West Virginia counties: Harrison, Barbour, Tucker, Pendleton, Lewis, Upshur, Randolph, Braxton, Webster, Pocahontas, Nicholas, and Greenbrier. In addition, parts of the following Virginia counties would underlie the proposed expansion and modification: Highland, Alleghany, Bath, and Botetourt. The landscape of West Virginia is rugged, as the Appalachian Mountain system passes from north to south through the state. The elevation within the proposed Evers MOA complex is approximately 2,100 ft above MSL in the lowest valleys to the highest point (Spruce Knob in Pendleton County) in West Virginia at 4,863 ft above MSL. Therefore, the proposed low airspace would rise and fall according to surface elevation to remain at least 1,000 ft AGL (i.e., approximately 3,100 ft above MSL at the lowest point).



This view shows the variable terrain beneath the southeast corner of the proposed Evers Low MOA beginning at 1.000 ft AGL.

The proposed SUA Complex is 80 NM north-south and 40 NM east west. The lowest portions would begin at 1,000 ft AGL and continue to 17,999 ft above MSL. The proposed SUA Complex would include three ATCAAs above the proposed MOAs extending up to FL 230 (23,000 ft AGL) (Figure 2-3).

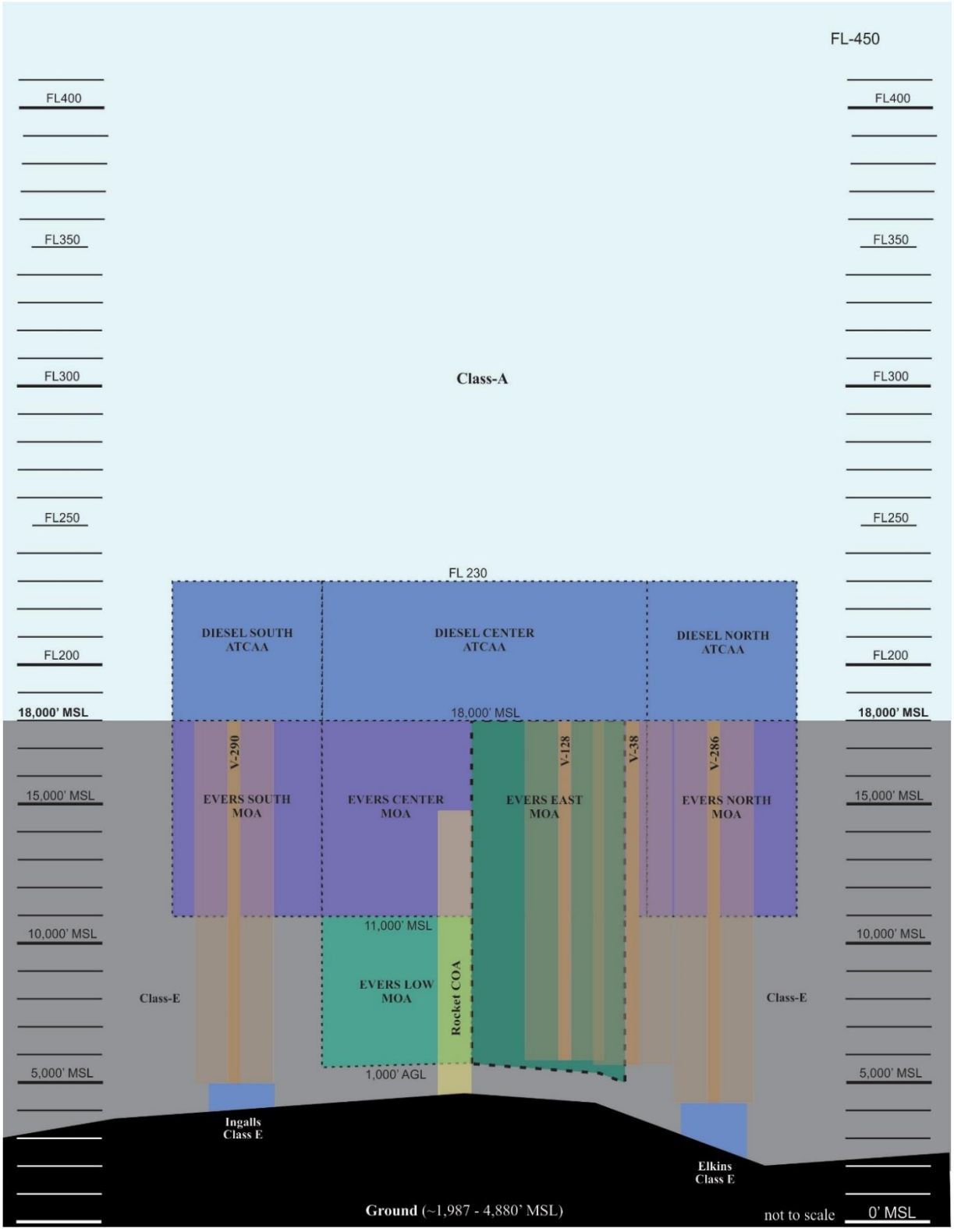
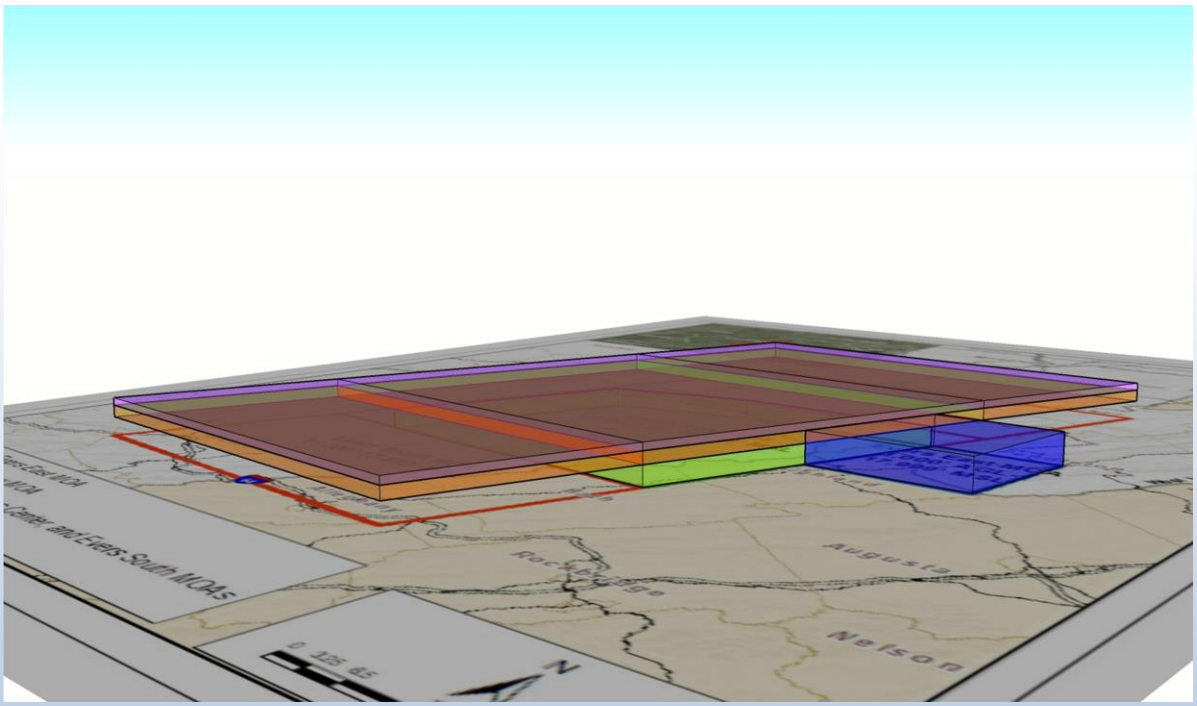


Figure 2-3. Cross-Section of Proposed Modification and Addition of Evers MOA

Under the Proposed Action, there would be no infrastructure changes, no ground-disturbing activities, no supersonic flight activities, no release of chaff and flares, no weapons firing, and no ordnance deployment within the proposed airspace.

The proposed expansion and modification of the Evers MOA would create for USAF aircraft an additional tactically diverse and valuable over land training environment on the eastern seaboard. The proposed shape and depth would allow fighter and cargo units to simulate weapons and stores delivery at both low and medium altitudes while targeting and being targeted, at a realistic range, from surface and air threats. The proposed expansion was conceived and built in coordination with FAA representatives to minimize civilian air traffic encroachment and conflict while maintaining the boundaries within a single air traffic controlling center. Through coordination with the Washington ARTCC, the subsections of the proposed MOAs and ATCAAs could be activated or deactivated as needed and distinguishable for aircrew adherence.



A special use airspace such as the proposed Evers MOA expansion and modification is a three-dimensional volume in the air designated for aircraft operations (military) where limitations may be imposed on aircraft not participating in those operations.

Table 2-1 provides the vertical limits and the charted times of use of the proposed SUA components. The lateral coordinates of the proposed airspace are presented in Appendix C.

Table 2-1. Vertical Limits and Charted Times of Use of Proposed Airspace

Airspace	Low-Level (1,000' AGL – 10,999' MSL)	Mid-Level (11,000' – 17,999' MSL)	ATCAA Level (FL180-FL230)	Charted Use
Evers North MOA		•		Sunrise to Sunset Daily Other times by Notice to Airmen (NOTAM)
Evers Center MOA		•		
Evers South MOA		•		
Evers Low MOA	•			
Evers East MOA	•	•		
Diesel North ATCAA			•	
Diesel Center ATCAA			•	
Diesel South ATCAA			•	

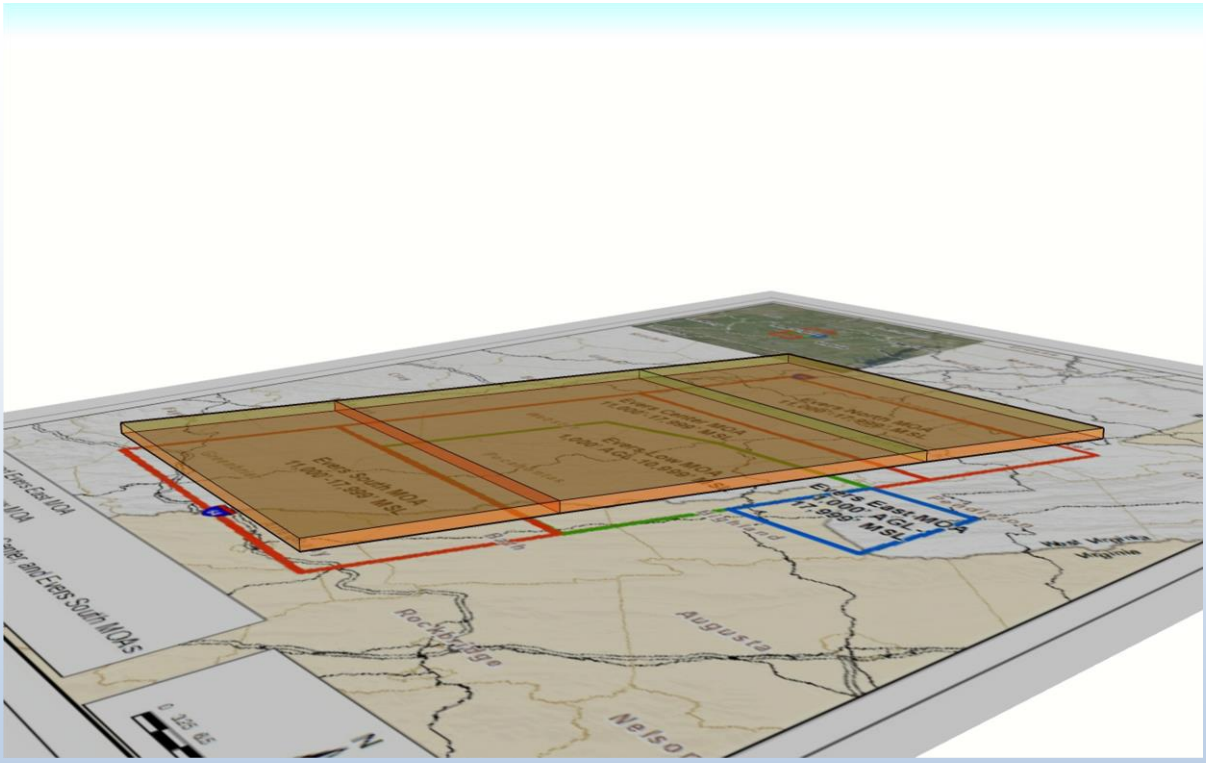
Note: There would be no operations conducted in the proposed SUA between 10:00 p.m. and 7:00 a.m.

2.2.1 Evers North MOA and Evers South MOA

Evers North and South MOAs are 25 x 40 NM areas on either side of Evers Center MOA. Each area can be combined with Evers Center to enable a 55 to 80 NM intercept range for air-to-air training or used individually as a 25 NM holding/marshalling area (Figure 2-1). The Evers North and South MOAs would begin at 11,000 ft above MSL and extend to 17,999 ft above MSL. The proposed North and South MOAs are deconflicted with the FAA air traffic control routes in a northeasterly-southeasterly direction with 20 NM length x 40 NM width dimensions.

2.2.2 Evers Center MOA

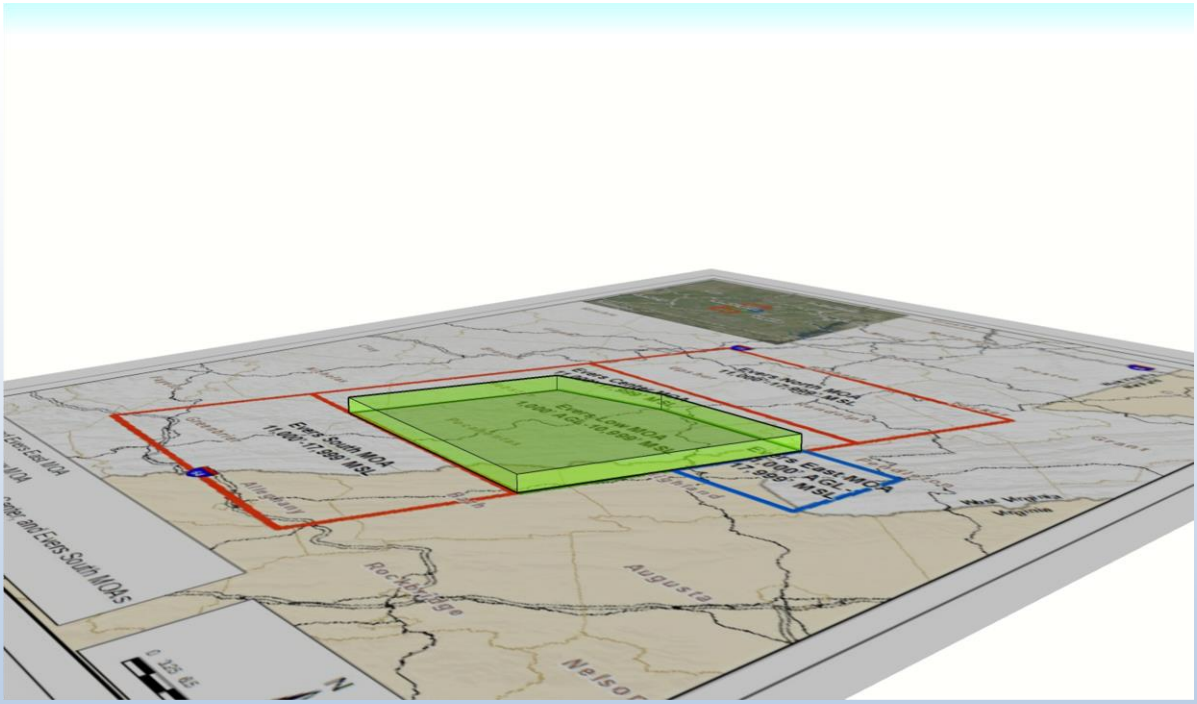
The Evers Center MOA would have the same northeasterly-southeasterly orientation as the Evers North and South MOAs for contiguous airspace and have the same vertical limits of 11,000 ft above MSL to 17,999 ft above MSL (Figure 2-1). The dimensions would be 40 x 40 NM.



The Evers North, Center, and South MOAs would provide the 80 NM minimum length of airspace for 113 WG training requirements.

2.2.3 Evers Low MOA

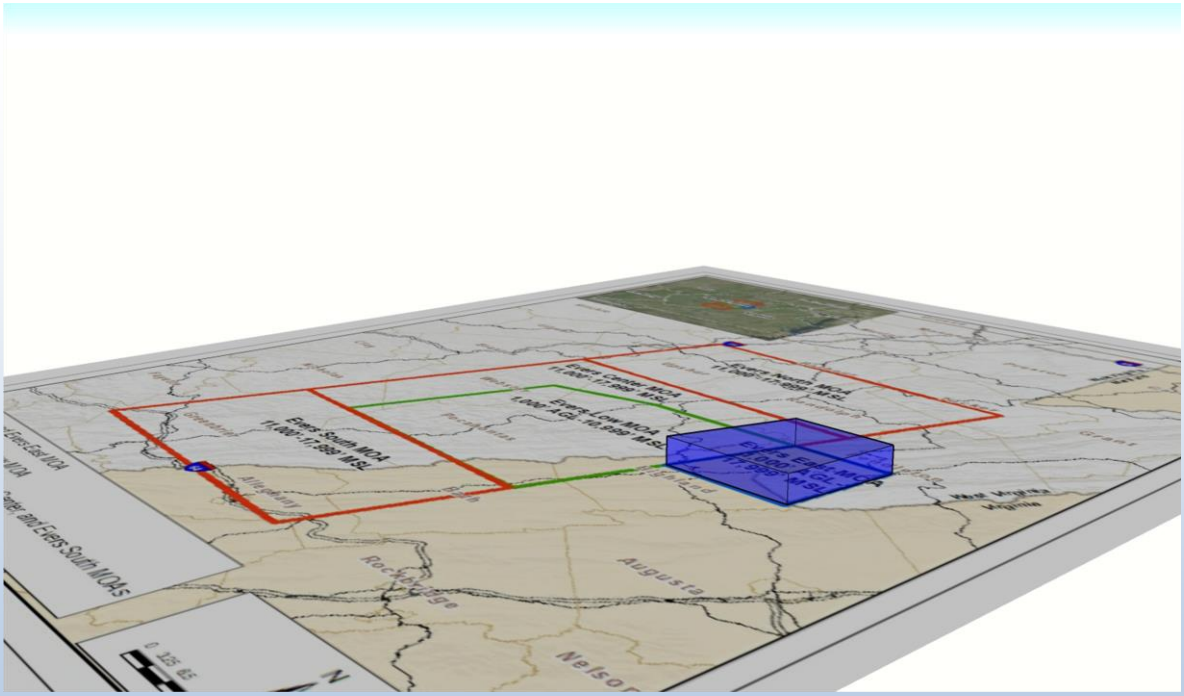
The proposed Evers Low MOA would be under the proposed Evers Center MOA, but with reduced north and west boundaries such that north-south and east-west transit corridors remain and allow traffic flow departing or recovering from civilian airfields (Figure 2-1). The Evers Low MOA would be geographically located to isolate low altitude training over sparsely populated areas and offset from civilian air traffic. The northern boundary and northeast corner of the proposed Evers Low MOA would be relocated to provide a 3-mile buffer from the southern boundary of the Clarksburg Airport Radar Approach Control area. The buffer would eliminate the need for redundant control coordination between Washington ARTCC and Clarksburg Airport.



The Evers Low MOA would begin at 1,000 ft AGL and join the Center MOA at 10,999 ft above MSL.

2.2.4 Evers East MOA

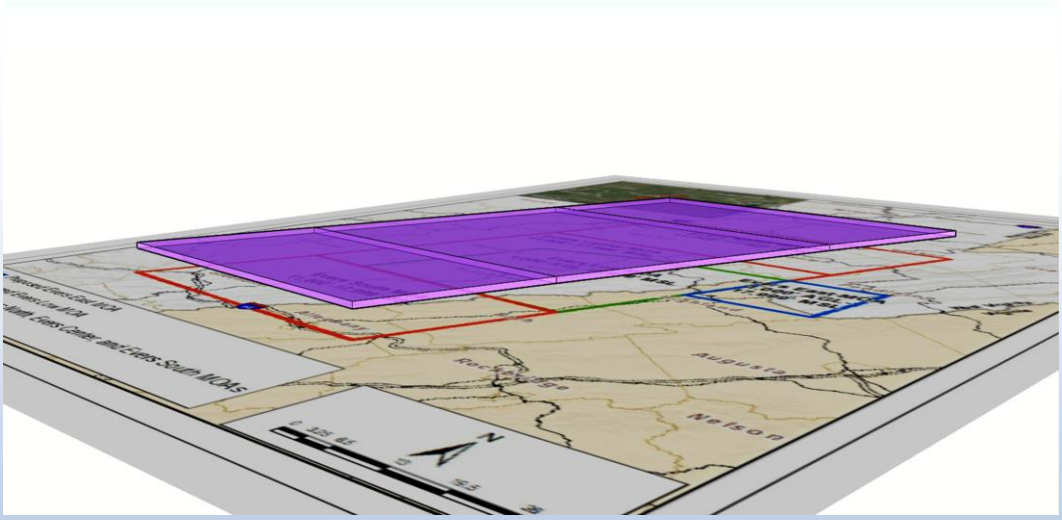
The proposed Evers East MOA would be approximately half the size in lateral dimensions of the existing Evers MOA (Figure 2-1). Establishment of the Evers East MOA would not in-and-of-itself constitute a change to the vertical or lateral boundaries when compared to the existing Evers MOA.



The Evers East MOA would maintain the vertical dimensions of 1,000 ft AGL to 17,999 ft above MSL.

2.2.5 Diesel ATCAAs (North, Center and South)

The proposed Diesel North, Center, and South ATCAAs would overlay the lateral boundaries of the Evers North, Center, and South MOAs (Figure 2-2), beginning at 18,000 ft above MSL and extending to 23,000 ft above MSL. According to FAA coordination, the proposed ATCAAs would be altitude de-conflicted with terminal arrivals while providing maximum weapon simulations at the designated altitudes.



The creation of three ATCAA's over the proposed MOA expansion and modification would provide a vertical airspace that effectively doubles the tactical training opportunities.

2.2.6 Aircraft Operations

The 113th WG operates the F-16C, which is a multi-role fighter platform currently in service. Operational activities would consist of MOA flight operations to include tactical combat maneuvering with abrupt, unpredictable changes in altitude and direction of flight. As authorized by FAA (Exemption No. 7960I), night vision goggle lights-out training may be conducted in the Evers MOA. The F-16C aircraft operations are defined in Table 2-2.

Table 2-2. Aircraft Operations Defined

Aircraft Operation	Definition
Defensive Counter Air (DCA)	The objective of DCA is to protect friendly forces and vital interests from enemy air and missile attacks and is synonymous with air defense.
Offensive Counter Air – Attack Operations (OCA-AO)	Air-to-ground weapons employment against adversary aircraft and integrated air defense systems.
Combat Search and Rescue (CSAR)	Operations that are carried out within or near combat zones by a task force of helicopters, ground-attack aircraft, aerial refueling tankers and an airborne command post.
Close Air Support (CAS)	Aircraft operations with strike capabilities in support of ground maneuver operations.

Aircraft Operation	Definition
Forward Air Control-Airborne (FAC-A)	Aircraft engaged in close air support of ground troops. The FAC-A is normally an airborne extension of the tactical air control party.
Air Interdiction (AI)	Aircraft operations to effect visual or electronic contact by a friendly aircraft with another aircraft.

2.2.6.1 Other Expected Users

Other expected users of the Evers MOA Complex that are included in the Proposed Action include the 175th Wing (175 WG), Maryland Air National Guard (MD ANG) flying A-10Cs, the 1st Fighter Wing (1 FW), Langley AFB, VA, flying F-22s and T-38s, the 4th Fighter Wing (4 FW), Seymour Johnson AFB, NC, flying F-15Es, and the 167th Airlift Wing (167 AW) flying C-17s and the 130th Airlift Wing (130 AW) flying C-130s both from the West Virginia Air National Guard. Other military users (for example U.S. Navy) could participate in exercises hosted by any of the expected users.

The federal mission of the 175 WG is to maintain combat forces ready for mobilization, deployment, and employment as needed to support national security objectives; its mission during peacetime has the combat-ready unit assigned to ACC. The 1 FW's mission is to rapidly deploy combat ready F-22 aircraft and airmen to perform air dominance and air defense missions in support of all U.S. operations. The 1 FW's T-38s provide professional adversary air support to enhance the F-22 combat capability. The 4 FW's F-15E mission is to be prepared to deploy anywhere in the world on short notice and deliver an array of air-to-ground weapons. The 167 AW operate C-17s to deliver people and equipment to locations around the globe. The 130 AW's mission is to deploy a force capable of conducting effective and sustained C-130 combat airlift operations in support in support of the USAF and the State of West Virginia.

2.2.6.2 Air Operations

The overall aircraft utilization phased in over time within the proposed airspace is presented in Table 2-3. The data are grouped into low level (below 11,000 ft above MSL), and mid-level (11,000 to 17,999 ft above MSL) to represent the limits of the MOA. Flight operations could include aircraft diving to 1,000 ft AGL for a small amount of time and then returning to higher altitudes. High-level (above 17,999 ft MSL) represents ATCAA use.

Table 2-3. Air Operations - Existing and Proposed Action

	Annual Usage				Individual Mission Parameters			
						Time at Altitude (minutes/sortie)		
Aircraft	Time in SUA (hours)	Number of Training Missions	Single Aircraft Sorties	Percentage of Operations in Busiest Month	Average Number of Aircraft Per Mission	Low-Altitude	Mid-Altitude	High-Altitude
Existing Operations								
F-16	109	194	485	20%	2.5	16.9	16.9	-
F-15E	40	52	192	15%	4.0	15.0	5.0	-
F-22	40	119	357	20%	3.0	3.0	17.0	-
T-38A	36	63	189	20%	3.0	5.1	28.9	-
A-10C	21	41	82	37%	2.0	15.0	15.0	-
Total/Average	**245**	**469**	**1,305**		**2.5**	**11.0**	**16.6**	**-**
Proposed Operations								
F-16	136	243	606	20%	2.5	10.1	10.1	13.5
F-15E	88	120	480	15%	4.0	13.2	13.2	17.6
F-22	40	119	357	20%	3.0	3.0	12.0	5.0
T-38A	36	63	189	20%	3.0	5.1	20.4	8.5
A-10C	21	41	82	37%	2.0	11.3	9.4	9.4
C-17	25	25	25	8%	1.0	15.0	15.0	30.0
C-130	20	40	80	15%	2.0	22.5	6.0	1.5
Total/Average	**365**	**651**	**1,819**		**2.5**	**11.4**	**12.3**	**12.2**

Low Altitude = 1,000 ft AGL – 10,999 ft MSL. Mid-Altitude = 11,000 ft – 17,999 ft MSL. High Altitude = FL180 – FL230.

2.3 ALTERNATIVES DISMISSED FROM FURTHER ANALYSIS

Modification of the Duke MOA located in Pennsylvania and New York was considered as an alternative but dismissed from further analysis. The distance, shape and size are incompatible with 113WG's/F-16C training requirements; the Duke MOA is more than 200 miles from the farthest end user, trapezoidal shape, and approximately 38 x 43 NM in size. The Duke MOA is appreciably farther and smaller than the proposed Evers MOAs. The lateral confines of the Duke MOA do not allow for effective tactical intercept training critical to the 113 WG F-16 Airspace Control Alert mission. In addition, the Duke MOA is incompatible with training that is essential for CMR. This alternative would not (1) be within 200 miles of the primary end-user or (2) establish a 40 x 80 NM airspace. This alternative does not meet the purpose and need of the Proposed Action; therefore, it will not be carried forward for detailed analysis in the EA.

Creation of a new stand-alone MOA within 200 miles of Joint Base Andrews was considered as an alternative that would allow full spectrum air-to-air and air-to-ground training but dismissed from further analysis because of the following factors. Factors considered were distance from Joint Base Andrews, established military airspace, airfields, park and recreation areas, agriculture areas, population centers, and expected population growth in areas. In coordination with FAA, the 113 WG determined that there was no uncongested airspace within the search area to create a new stand-alone MOA over land.

Continued use of Patuxent River R4006 was considered as an alternative but was dismissed from further analysis. R4006 has historically been used for 113 WG training requirements that did not require over-land training. However, the 113 WG does not have priority for airspace use and due to airspace requirements of the host-user (Navy P-8s, F-35s, etc.), it does not have predictable availability for the 113 WG. In addition, R4006 is predominantly over water, making it unrealistic as a training area for the 113 WG.

In addition to the above-mentioned alternatives, the 113 WG has investigated the use of other airspaces to complete their training. Such as the use of existing RAs, warning areas, MTRs, and other larger airspaces further away. These are described briefly below, but as none of these options meet the purpose and need of the Proposed Action, they will not be carried forward for detailed analysis in the EA.

- Air combat maneuvering is prohibited in Fort Pickett, Virginia MOAs according to Chapter 6 of the Fort Pickett Range Regulation.
- Warning Areas (W-107/386) over the Atlantic Ocean are primarily used for unrestricted air-to-air training only. Neither W-107 or W-386 present valuable target replication for air-to-ground mission training because the absence of terrain features, moving vehicles, personnel, and surface roadways do not provide a realistic training scenario.
- MTRs limit dynamic tactical training because of the one-way construct and the limited widths of the route structures.
- Larger airspaces that meet 113 WG training requirements exist but are beyond the normal average sortie duration of the F-16C. Either dedicated fuel tanker support or off-station refueling operations would be needed to make use of the MOAs.

2.4 NO ACTION ALTERNATIVE

The CEQ regulation 40 CFR §1502.14(d) specifically requires analysis of the No Action Alternative in all NEPA documents. Current operations in the existing Evers MOA would continue under the No Action Alternative. Under the No Action Alternative, the 113 WG would continue to experience training shortfalls that negatively impact combat readiness and pilot safety. Training shortfalls result from not having the availability of a spatially viable combat training environment to qualify and maintain aircrew capabilities, preserve readiness, and ultimately achieve our national objectives.

The No Action Alternative would not provide for compliance with F-16C RAP Tasking Memorandum and AFI 11-2F-16V1 continuing training program.

2.5 SUMMARY

Table 2-4 presents a summary of the alternatives compared to the selection criteria. Only the Proposed Action meets all the selection criteria and it, along with the No Action Alternative, have been carried forward for detailed analysis in this EA.

Table 2-4. Summary of Alternatives

Selection Criteria	Proposed Expansion of Evers MOA	Modification of the Duke MOA	New Stand-Alone MOA	Patuxent River/ R4006	No Action Alternative
Reasonable distance (200 miles) of primary end-user	Yes	No	No	Yes	No
Adequate size and shape (40 x 80 NM)	Yes	No	No	Yes	No
Adequate availability to the primary end-user	Yes	No	Yes	No	No
Controlled by a single ARTCC	Yes	No	Yes	Yes	No
Meets All Selection Criteria	Yes	No	No	No	No

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes relevant and existing environmental conditions for resources potentially affected by the Proposed Action. In compliance with NEPA, CEQ regulations, and AFI 32-7061, the assessment focuses only on resource areas subject to environmental effects. The affected environment and assessment of environmental consequences focuses on the modification and expansion of the Evers MOA Complex. The Region of Influence (ROI) includes all or parts of the following West Virginia counties: Harrison, Barbour, Tucker, Pendleton, Lewis, Upshur, Randolph, Braxton, Webster, Pocahontas, Nicholas, and Greenbrier. In addition, parts of the following Virginia counties underlie the proposed expansion and modification: Highland, Alleghany, Bath, and Botetourt. A brief discussion of resource areas with negligible environmental effects anticipated from implementation of the Proposed Action is presented in Section 1.5 *Resources Not Carried Forward for Detailed Analysis*.

3.1 AIRSPACE MANAGEMENT

3.1.1 Definition of Resource

Airspace is the four-dimensional area (space and time) that overlies a nation and falls under its jurisdiction. Airspace consists of both controlled and uncontrolled areas. Controlled airspace and the constructs that manage it are known as NAS. This system is "…a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures; technical information; and manpower and material" (FAA 2015). Navigable airspace is airspace above the minimum altitudes of flight prescribed by Title 49, Subtitle VII, Part A, Air Commerce and Safety, and includes airspace needed to ensure the safety of aircraft launch, recovery, and transit of the NAS (49 U.S.C. 40102).

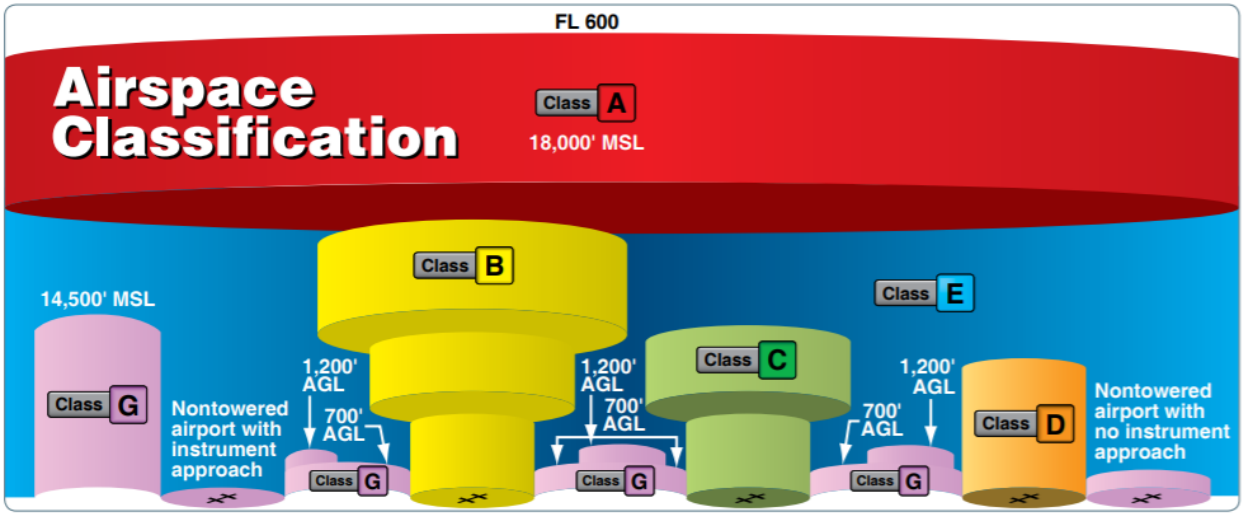
Congress has charged the FAA with the responsibility of developing plans and policies for the use of navigable airspace and assigning, by regulation or order, the use of the airspace necessary to ensure efficient use and the safety of aircraft (49 U.S.C. 40103(b)). The FAA also regulates military operations in the NAS through the implementation of FAA Order JO 7400.2M, Procedures for Handling Airspace Matters and FAA Order JO 7610.4T, Special Operations. FAA Order JO 7610.4T was jointly developed by the DOD and FAA to establish policy, criteria, and specific procedures for ATC planning, coordination, and services during defense activities and special military operations. The use and management of airspace by USAF organizations is defined in AFI 13-201 Air Force Airspace Management and AFI 11-214 Air Operations and Procedures.

Different classifications of airspace are defined by different types of altitude measurements. The classifications commonly referred to throughout this section are:

- Above Ground Level - The distance above ground level.
- Mean Sea Level - The altitude above mean sea level as defined by altimeter instrumentation.
- Flight Level (FL) - Altitudes expressed in hundreds of feet.

IFR and VFR are the two basic modes of flying. IFR is a method of air navigation that relies on instrumentation, and which is always under the direction of ATC. As aircraft launch at one airport, traverse the sky, and then land at a different airport, every movement is directed by the ATC. Control is transferred from one ATC to another as aircraft cross jurisdictional lines as designated by the FAA. VFR is a method of air navigation that relies primarily on visual reference for location and see-and-avoid techniques for safe separation of aircraft. VFR flying is subject to weather conditions.

Controlled airspace is a limited section of airspace where ATC is provided to IFR and VFR traffic. Controlled airspace classifications[2] include Classes A through E and Class-G (there is no Class-F) (Figure 3-1).



Source: Pilot's Handbook of Aeronautical Knowledge, Chapter 15 (FAA 2019b)

Figure 3-1. Airspace Classification Diagram

- Class-A airspace is from 18,000 ft above MSL up to and including FL 600. The airspace is dominated by commercial traffic using designated flight routes. Unless otherwise authorized, all pilots must operate their aircraft under IFR.
- Class-B airspace is from the surface to 10,000 ft above MSL surrounding the nation's busiest airports. Class B airspace is designed to contain all published instrument procedures

[2] https://aspmhelp.faa.gov/index.php/Airspace_Classification

once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. There is no Class B airspace in the state of West Virginia; the nearest Class B airspace is around Washington Dulles airport.

- Class-C airspace is from the surface to 4,000 ft above the MSL elevation surrounding those airports that have an operational control tower, are serviced by a radar approach control, and have a certain number of IFR operations or passenger enplanements. The airspace usually consists of a surface area with a 5 NM radius, an outer circle with a 10 NM radius that extends from 1,200 ft to 4,000 ft above the airport MSL elevation and an outer area. Each aircraft must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. There is a Class-C airspace around the Charleston Yeager Airport in Charleston, WV approximately 55 NM west of the proposed SUA. Another exists at Roanoke Regional Airport in Roanoke, VA approximately 30 NM south of the proposed SUA. Further out is a Class-C airspace around Richard Byrd International Airport at Richmond, VA approximately 100 NM east of proposed SUA
- Class-D airspace is from the surface to 2,500 ft above the MSL elevation surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Unless otherwise authorized, each aircraft must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace.
- Class-E airspace is any controlled airspace that is not Class A, B, C, or D. It extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also, in this class are federal airways, airspace beginning at either 700 or 1,200 ft AGL used to transition to and from the terminal or en route environment, and en route domestic and offshore airspace areas designated below 18,000 ft above MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 ft above MSL over the United States up to but not including 18,000 ft above MSL, and the airspace above FL 600.
- Class-G airspace that is not designated as Class A, B, C, D, or E. Class G airspace is essentially uncontrolled by ATC except when associated with a temporary control tower.

MOAs are airspaces established for separating certain military training activities from IFR traffic. IFR traffic may be cleared to pass through an active MOA if adequate IFR separation criteria can be met and procedures are described in a Letter of Agreement between the military unit and the

ATC controlling agency (FAA Order JO 7400.2). Non-participating VFR aircraft can operate in an active MOA while using see-and-avoid flight procedures to avoid military training activities. All MOAs and RAs are depicted on sectional charts identifying the exact area, the name of the airspace, altitudes of use, published hours of use, and the controlling agency. ATCAAs are uncharted airspace above 17,999 ft MSL that accommodate high-altitude military flight training. ATC routes IFR traffic around ATCAAs when activated.

3.1.2 Affected Environment

The existing Evers MOA (Figure 3-2) consists of a single MOA over mountainous terrain along the border between Virginia and West Virginia. The rectangular Evers MOAs is oriented approximately 18.4 NM north-south and 34.5 NM east-west. The ROI is an area extending 10 NM outside the MOAs and ATCAAs that make up the Proposed Action (Figure 3-2). The ROI encompasses activities in and around the Evers MOA Complex that would be affected by the Proposed Action.

3.1.2.1 Military Operations Area

The ROI includes the existing Evers MOA which extends from 1,000 ft AGL up to 17,999 ft above MSL. The airspace charted activation times are sunrise to sunset by NOTAM. It is 634 SM over parts of Virginia and West Virginia. It lies entirely within and is controlled by the Washington ARTCC (Washington Center). The primary user organization is the 113 WG of the DCANG.

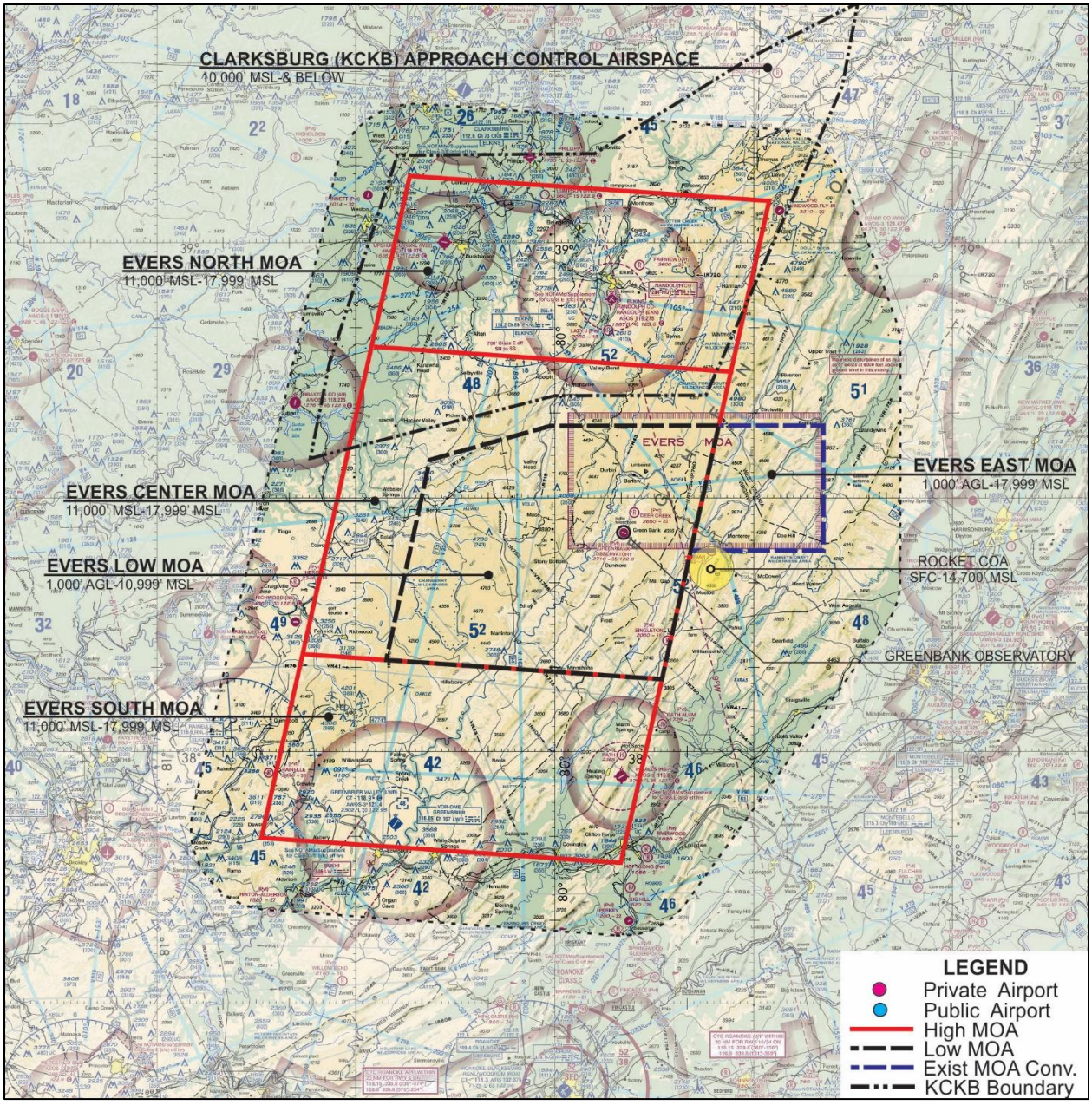


Figure 3-2. ROI with Existing and Proposed MOAs

3.1.2.2 Federal Air Corridors

Federal airways are linear routes that extend between navigational beacons which broadcast directional information allowing aircraft to maintain course along a route. Federal airways include low-altitude victor airways and high-altitude jet routes. Victor airways extend from 1,200 ft AGL to 18,000 ft above MSL in Class-E airspace. There are ten Victor airways that traverse the ROI. Three routes (V-38, V-128, and V-469) are charted through the existing Evers MOA (Figure 3-3). High-altitude commercial "J" routes and "Q" routes extend from FL180 to FL450 and provide a

more systematic flow of high-altitude air traffic. There are several commercial J-Routes and Q–Routes in the high IFR airspace that traverse the ROI (Figure 3-4). All the high-altitude routes are above the existing Evers MOA.

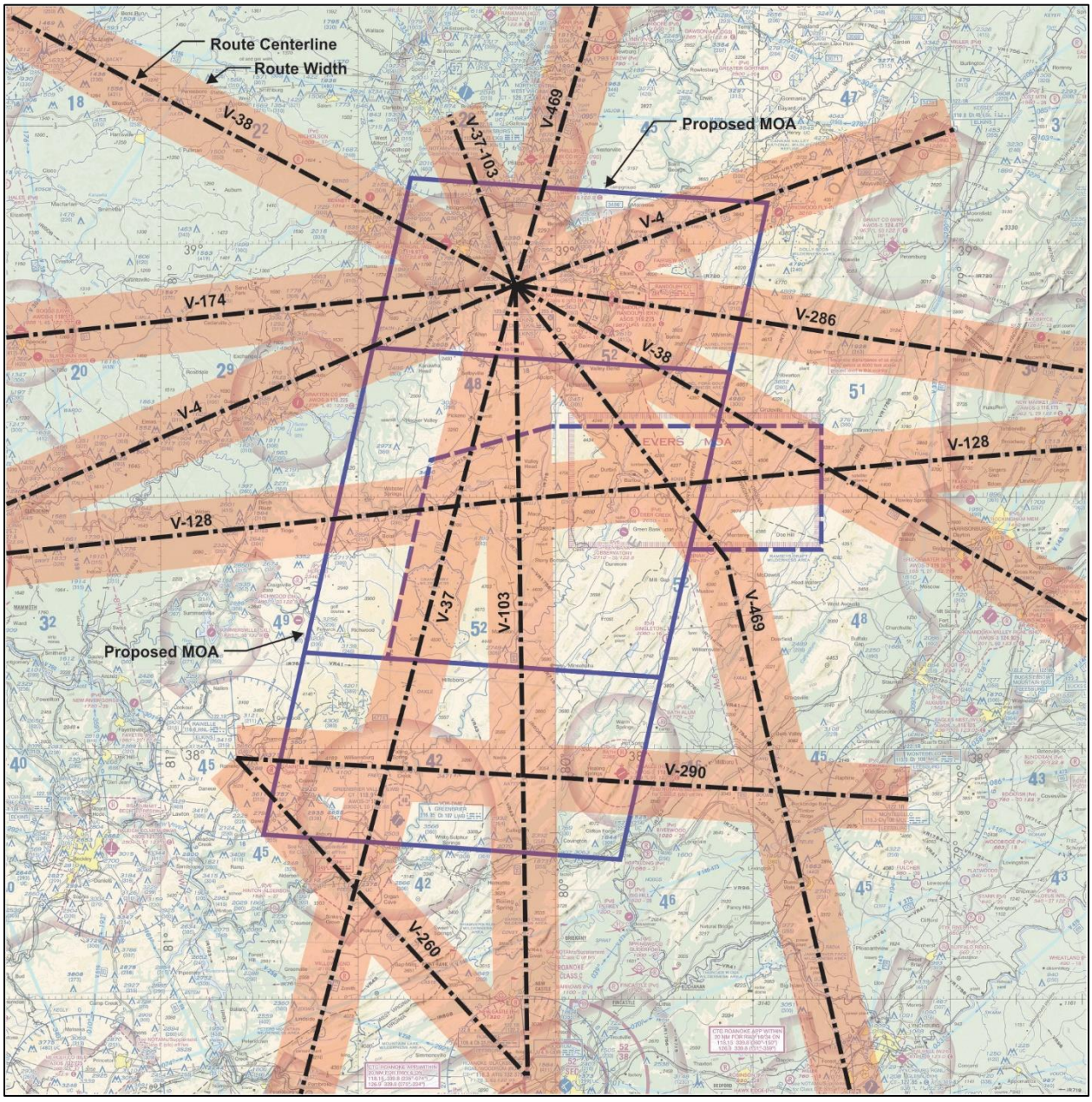


Figure 3-3. Low-Altitude Victor Routes in ROI

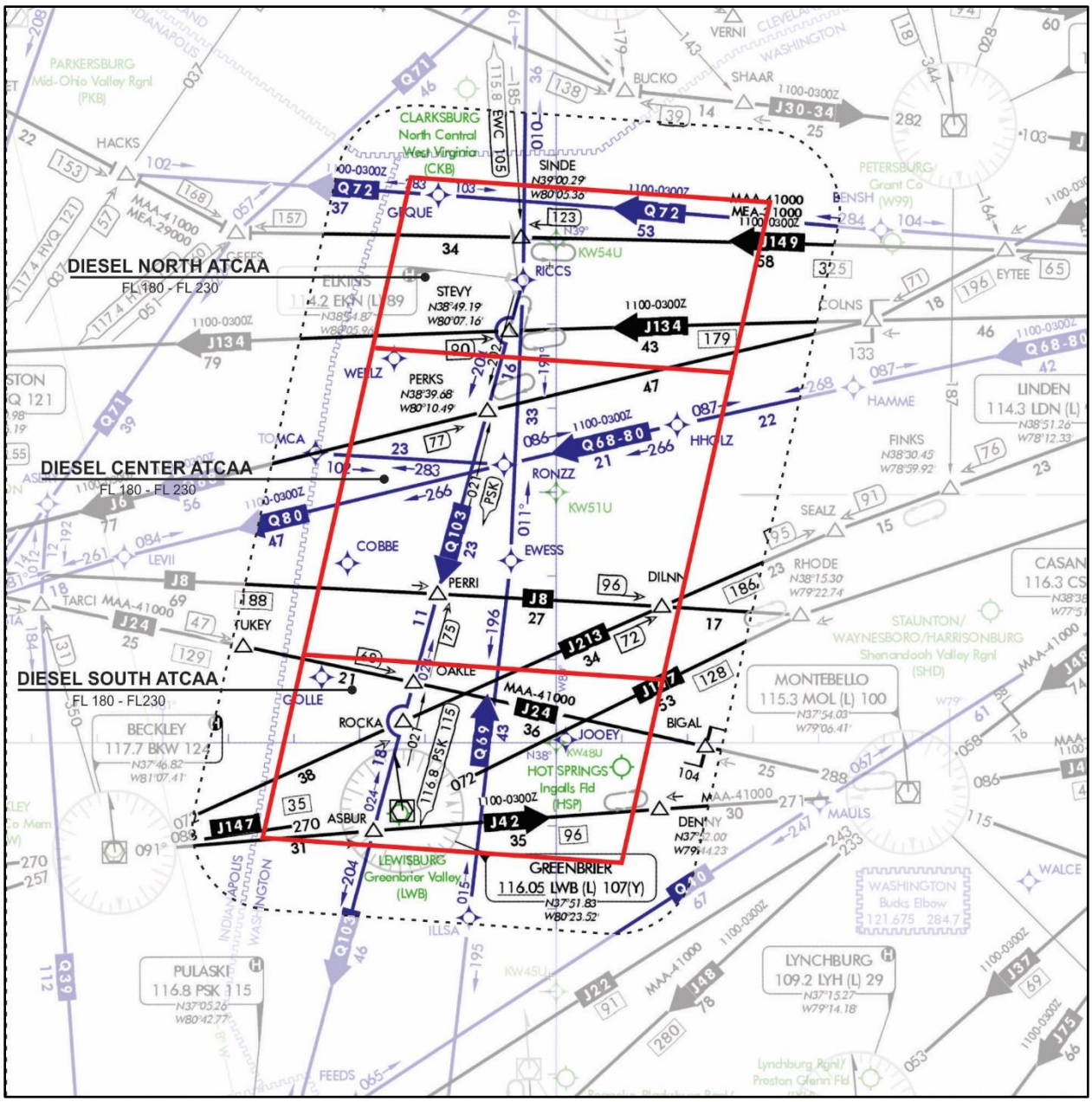


Figure 3-4. High-Level J & Q Air Routes in the ROI

3.1.2.3 Military Training Routes

There are several established MTRs used by the military for low-level training (Figure 3-5). MTRs are aerial corridors in which military aircraft can operate below 10,000 ft faster than the maximum safe speed of 250 knots that all other aircraft are restricted to while operating below 10,000 ft. MTRs are divided into Instrument Routes (IR), and Visual Route (VR). Each route is identified by either of these two letters, followed by either four digits for routes below 1,500 ft above ground

level, or three digits for routes extending for at least one leg above 1,500 ft AGL. (i.e., VR-1056). The difference between the IR and VR routes is that IR routes are flown under the control of ATC, while VR routes are not (FAA JO 7610.4V, Air Traffic Organization Policy).

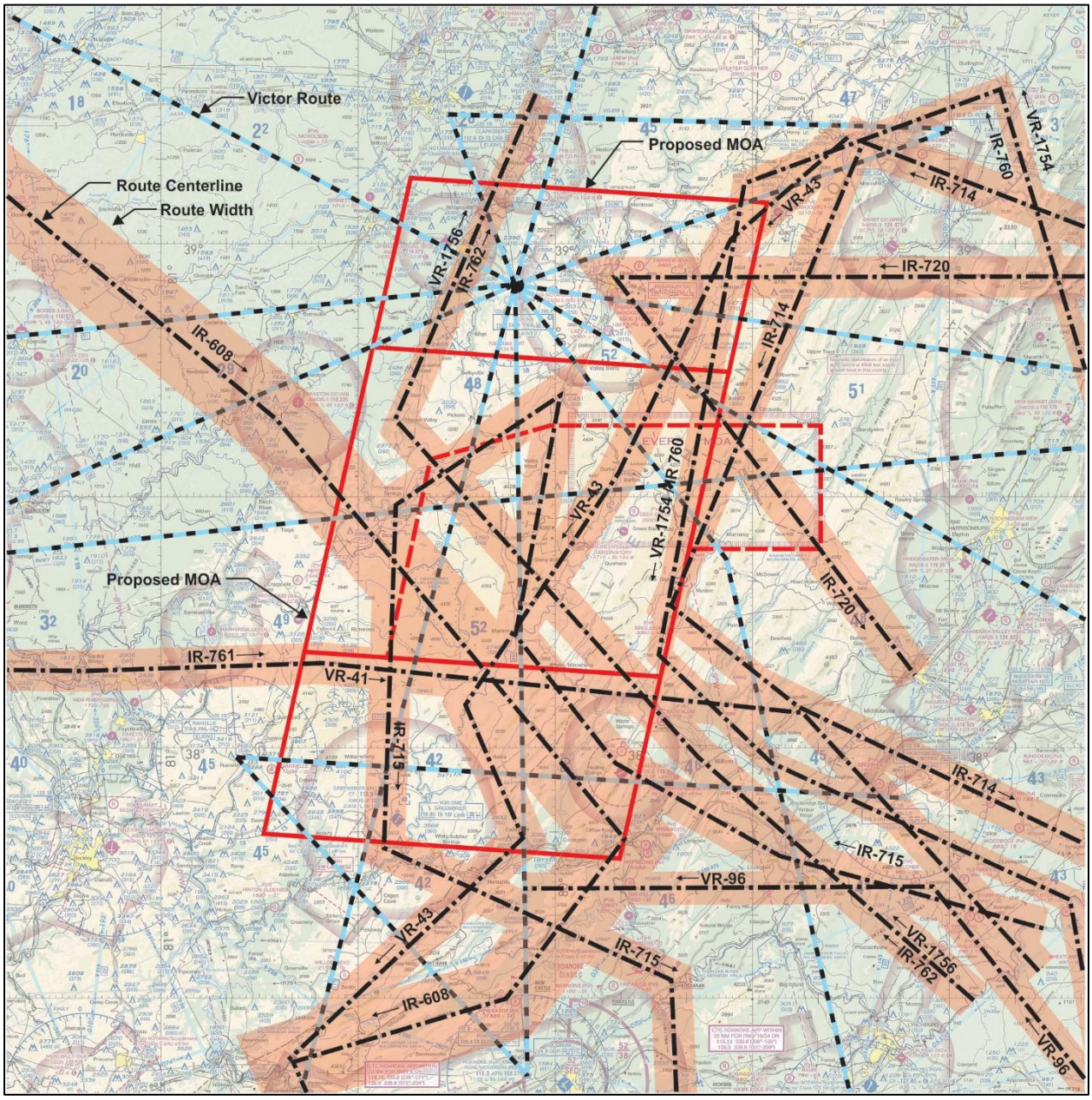


Figure 3-5. Low-Level Military Traffic Routes with Corridor Width

Several organizations in the area also use the airspace including those listed in Table 3-1, which includes all fiscal year 2018 usage numbers for all units. Table 3-1 identifies the characteristics

and annual usage of the MTRs in the ROI. There are seven IRs and four VRs in the ROI. VR-43 has 1,259 sorties per year, whereas all other MTRs have limited usage.

Table 3-1. Military Training Route Characteristics

Route	Width (NM)	Altitude	Usage (# Sorties 3Yr Average)	Scheduling Agency
VR 41	I-J:10/J-K: 5L&4R	500 AGL 10,500 MSL	127	Seymour
IR 761	10	6,000 MSL-7,000 MSL	13	Oceana
VR 43	10	100 AGL-10,500 MSL	1,259	Seymour
IR 608	20	9,000 MSL-10,000 MSL	0	NAS
IR 714	G-H: 3L&5R/H-I: 10	G-H: SFC-6,000 MSL/I: 6,000	NA	Oceana
IR 715	10	8,000 MSL	1	Oceana
IR 720	10	7,000 MSL-8,000 MSL	0	Oceana
IR 760	6	SFC-6,000 MSL	0	Oceana
VR-1754	6	G:500-1500 AGL/H-I:SFC-	101	Oceana
IR 762	B-C: 10/C-D: 5R&2L	B-C:7,000 MSL/D:6,000 MSL	17	Oceana
VR 1756	2L&1R	SFC-1,500 AGL	39	Oceana

NA=Not Available

3.1.2.4 Existing Aircraft

Aircraft in the region are tracked in the Performance Data and Reporting System (PDARS). This data includes Victor route flights, military air operations, and all aircraft with active transponders. The tracks depicted are all the transits, both military and commercial/civilian as provided by FAA. Table 3-2 outlines the total annual number of aircraft that fly through the proposed airspace. In 2018, 13,881 aircraft flew through the airspace which encompasses the proposed Evers North, Center and South MOAs combined. During the same period, 4,492 aircraft flew through the airspace of the proposed Evers Low MOA. It is estimated that 5 percent of the individual flights entered both the proposed high and low airspaces. Approximately 5,911 of the total non-military flights would be VFR and 8,866 would be IFR (FAA 2018). Figures 3-6 and 3-7 show the existing flight tracks for 2018 overlaid on the proposed MOAs and the existing Evers MOA.

Table 3-2. Annual Aircraft in the Airspace

Altitude Block	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
High	803	732	858	1,077	1,259	1,348	1,373	1,454	1,326	1,436	1,179	966	13,811
Low	258	191	260	426	426	530	522	463	353	437	344	282	4,492

High Altitude Block is 11,000 ft above MSL – 17,999 ft above MSL.
Low Altitude Block is Surface to 10,999 ft above MSL.

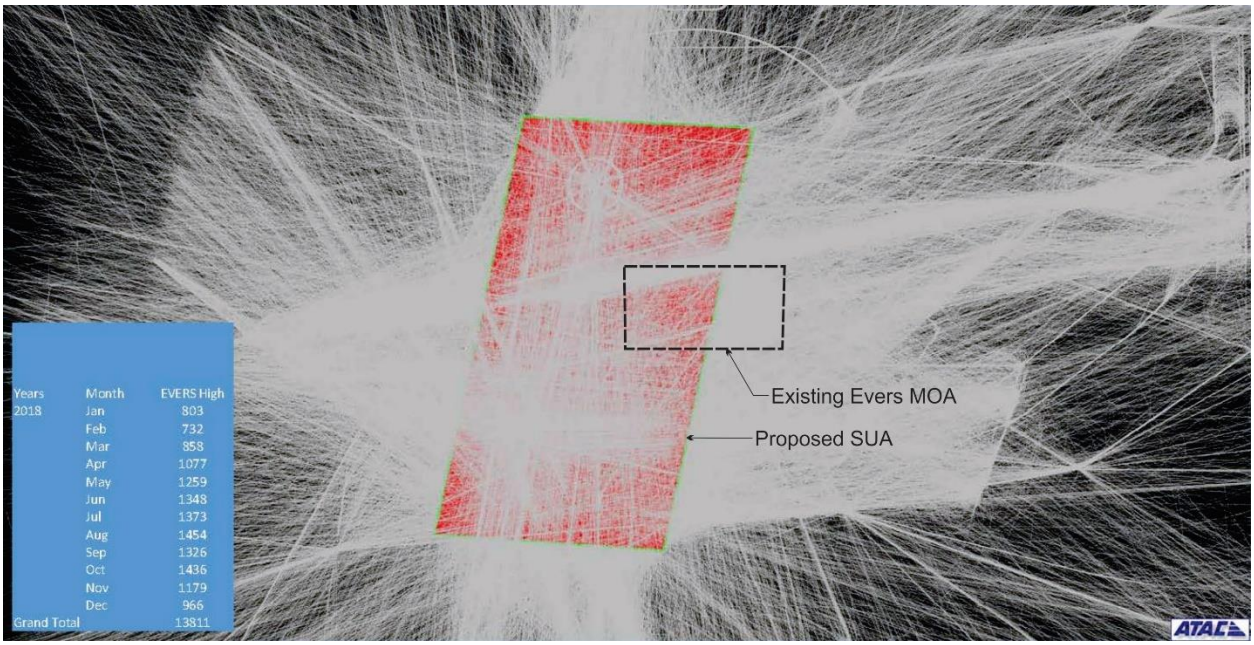


Figure 3-6. Existing Flight Tracks - Proposed Evers North, Center and South MOAs

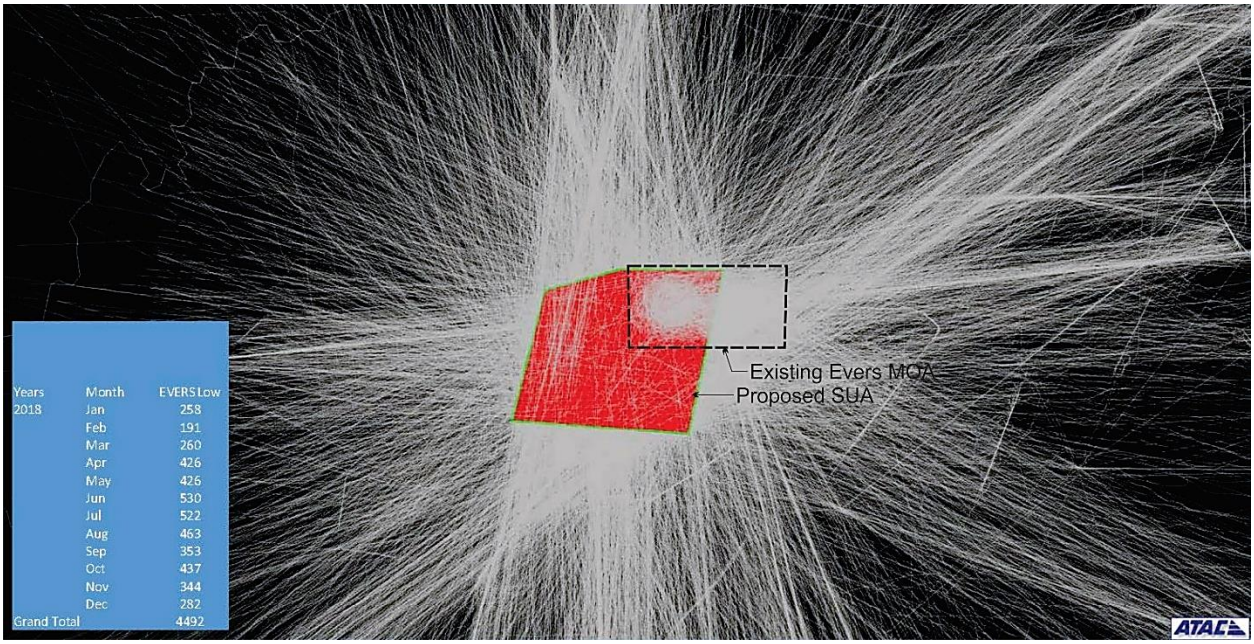


Figure 3-7. Existing Flight Tracks - Proposed Evers Low MOA

3.1.2.5 Airfields

Table 3-3 and Figure 3-8 provide information on civilian airfields located within the ROI. The Washington DC Center (ZDC) is not the controlling agency for several airports in the area,

including Elkins-Randolph Airport, Greenbrier Valley Airport, Upshur County Regional Airport, Braxton County Airport, Louis Bennett Airport, and Philippi/Barbour County Airport. ZDC will identify and initiate letters of agreement or procedures with other applicable military units and ATC facilities as needed. This will allow the safe and expeditious flow of air traffic in, around, and through the proposed MOA.

Table 3-3. Civilian Airfields in the ROI

Airport Name	ID	Status (Public/ Private)	ARTCC	A/D	Airport Airspace Class	ILS	RNAV	AVG OPS/YR
Beneath Proposed MOA								
Bath Community Hospital	47V	Private	ZDC	ZDC	E	-	-	-
Deer Creek Farm Airport	WV0	Private	ZDC	ZDC		-	-	-
Elkins-Randolph County Airport	KEK	Public	ZOB	CKB-	E	-	X	10,585
Fairview Airport	WV7	Private	ZDC	ZDC	Trans-E	-	-	-
Green Bank Observatory Airport	WV5	Private	ZDC	ZDC		-	-	-
Greenbrier Valley Airport	KLW	Public	ZDC	LWB-	D	X	X	17,885
Hannah Field Airport	7VA	Private	ZDC	ZDC		-	-	-
Ingalls Field Airport	KHS	Public	ZDC	ZDC	E	X	X	9,855
Lazy J Aerodrome	00W	Private	ZDC	ZDC	E	-	-	-
Simpson Airport	9W3	Public	ZDC	ZDC	Trans-E	-	-	60
Singleton Airport	97V	Private	ZDC	ZDC		-	-	-
Upshur County Regional Airport	W22	Public	ZOB	CKB-	Trans-E	-	X	9,855
Within ROI								
Bath Alum Airport	9VA	Private	ZDC	ZDC	Trans-E	-	-	-
Braxton County Airport	48I	Public	ZOB	ZID	Trans-E	-	X	3,068
Louis Bennett Field Airport	WV2	Private	ZOB	ZOB		-	-	50
Big Hill Airport	44V	Private	ZDC	ZDC		-	-	-
Herold Airport	WV6	Private	ZDC	ZDC		-	-	2,496
Hop-Along Airport	12V	Private	ZDC	ZDC		-	-	-
Perkey Airport	79V	Private	ZDC	ZDC		-	-	-
Philippi/Barbour County Regional	79D	Public	ZDC	CKB-	Trans-E	-	X	4,004
Rainelle Airport	WV3	Private	ZDC	ZDC		-	-	74
Richwood Municipal Airport	3I4	Public	ZDC	ZDC		-	-	200
Riverwood Airport	0VA	Private	ZDC	ZDC		-	-	-
Windwood Fly-In Resort Airport	WV6	Private	ZDC	ZDC		-	-	-

ZDC=Washington ARTCC, ZOB=Cleveland ARTCC, ZID=Indianapolis ARTCC, CKB=Clarksburg Approach Control, LWB= Lewisburg Approach Control, A/D=Airport Designation, ILS=Instrument Landing System, RNAV-Area Navigation, AVG OPS/YR=Average Operations per Year

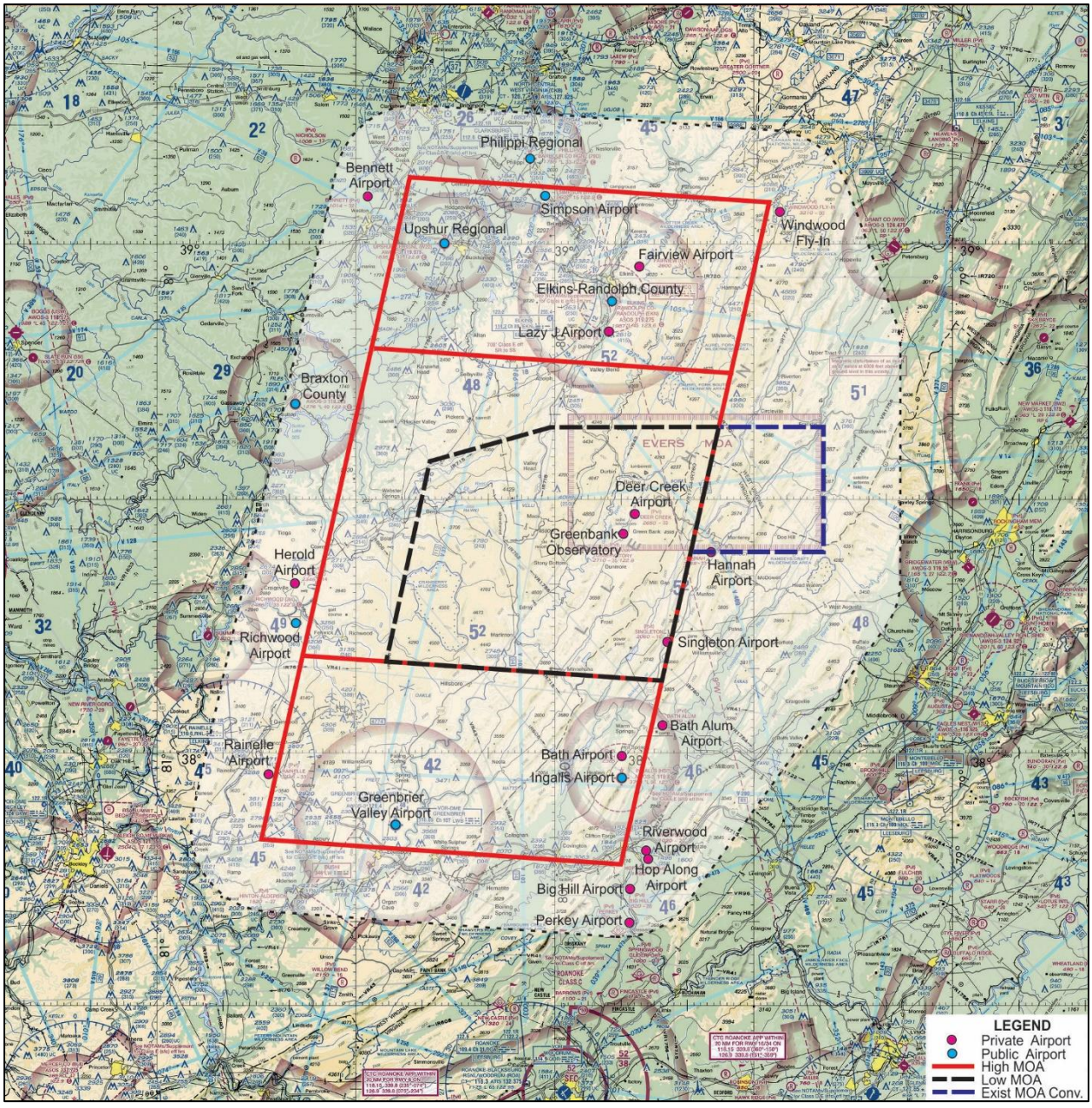


Figure 3-8. Sectional Showing Airports Within the ROI

3.1.2.6 Amateur Rocket Launch Facility

The Valley Aerospace Team of Staunton, Virginia received a Certificate of Authorization (COA) to conduct amateur rocket operations near Monterey, Virginia (see Figure 3-2). The Valley Aerospace Team was formed in early 2005 and started launching at the current launch site in 2010. The COA includes limitations for Class II unmanned rockets launched within 2 NM of the launch facility, not to exceed 12,000 ft AGL or 14,700 ft above MSL, between sunrise and sunset.

Nighttime launches are between sunset and midnight, within a 1 NM safety buffer, not to exceed 3,000 ft AGL or 5,700 ft above MSL. Additionally, the organization contacts the LEIDOS Flight Service Station at least 24 hours before a launch to request a NOTAM. The Valley Aerospace Team must contact ZDC, the 113 WG Scheduling Office, and Fleet Area Control and Surveillance Facility 1 hour before, 15 minutes before, and after launch operations. The launch site is south of the existing Evers MOA, but the safety buffer is in the proposed airspace. The safety buffer intersects the eastern boundary of the proposed Evers Low and Evers Center MOAs.

Most of the flights are under 6,000 ft AGL (daytime) and 2,000 ft AGL (nighttime). The lateral distance is typically under 1,500 ft. The Valley Aerospace Team has never had a rocket travel more than 1 NM from the range area, which is well within their approved 2 NM radius area.

The Valley Aerospace Team has the ability to run flight simulations using several different computer software programs. They do not typically fly close to COA issued by the FAA due to the weather conditions and proximity of trees around the site. Also, the maximum launch altitude for flights containing research motors is 90 percent of the authorized altitude established by the FAA.

3.1.2.7 Greenbank Observatory and National Radio Quiet Zone

The Green Bank Observatory (GBO) in Green Bank, West Virginia is the original site of the National Radio Astronomy Observatory and was formed in 1957 for the purpose of astronomical observations into the radio universe. The GBO operates and maintains several large, extremely sensitive radio telescopes for the purpose of collecting astronomical radio wavelength emissions for the study of the universe. The GBO is off Highway 92 between Boyer and Dunmore, West Virginia. The GBO's National Radio Quiet Zone (NRQZ) covers 13,000 SM where radio transmissions are restricted for scientific research and gathering of military intelligence (Figure 3-9). The area is split between west-central Virginia, east-central West Virginia, and the southernmost tip of the Maryland panhandle. The Federal Communications Commission created the NRQZ to minimize interference with the GBO, and to provide protection for the U.S. Navy Information Operations Command activities conducted at Naval Air Station Sugar Grove. Coordination with the NRQZ Administration Office is required for all licensed transmitters inside the NRQZ.

The nature and sensitivity of the GBO telescopes enable the collection of weak astronomical signals. The Robert C. Byrd Green Bank Telescope operates at frequencies between 200 megahertz and 116 gigahertz, with a collecting sensitivity of 10^{-32} watts per square meter per hertz. The maximum height of the telescope is 485 ft AGL. The location of the proposed Evers Low MOA would be approximately 500 ft above this telescope.

The GBO is beneath the existing Evers MOA. The military training events and the GBO have coexisted for many years without impact. The Proposed Action will not change the military airspace over the GBO.

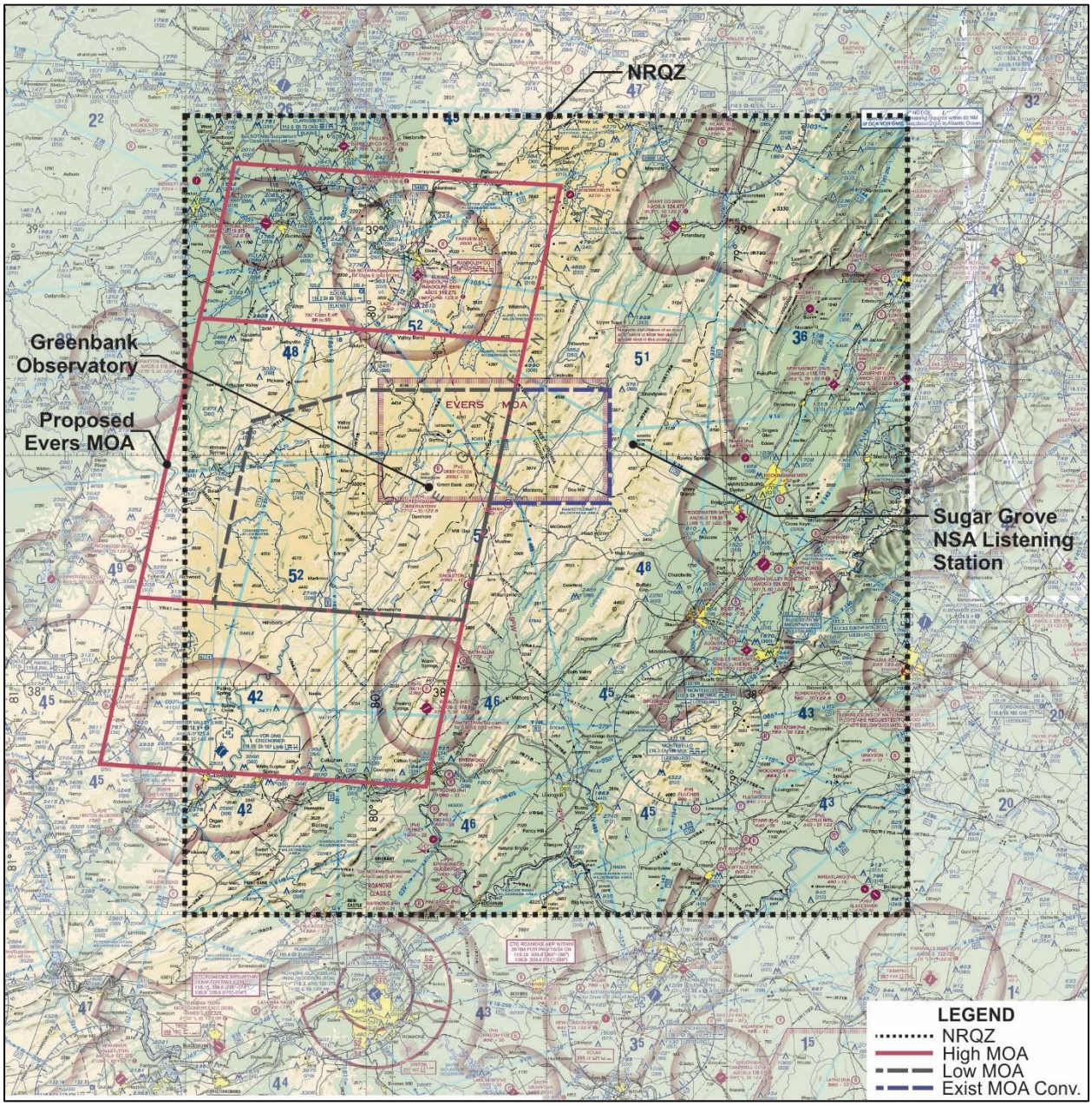


Figure 3-9. National Radio Quiet Zone

3.1.2.8 U.S. National Forests

George Washington and Thomas Jefferson National Forests (Regions 8) and Monongahela National Forest (Region 9) conduct aerial surveys for wildland fire and prescribed fire operations,

fire suppression, and prescribed fire treatments within the proposed Evers MOA Complex. Aerial controlled burn operations are conducted at various locations across the forests. The U.S. Forest Service issues NOTAMs when conducting aircraft operations.

3.1.2.9 Aircraft Mishaps

Safety of military aircraft operations are described through an aircraft's "mishap rate," which is the number of mishaps per 100,000 flying hours for each aircraft type. The time between mishaps is calculated by comparing the mishap rate with the number of hours flown annually. Safety Investigation and Hazard Reporting mishaps are categorized by the USAF based on the severity of injury and the amount of damage measured in monetary value. These are classified as Class A – E, with Class A being the most critical and Class E being the least (Air Force Guidance Memorandum to AFI 91-204, *Safety Investigation and Hazard Reporting*). Table 3-4 outlines the Air Force-wide mishaps rates and the time within the airspace for the primary aircraft utilizing the Evers SUA Complex. Most aircraft mishaps occur during the landing and take-off phase and not during flight training in airspace; therefore, the expected mishap rates for the SUA Complex would be lower than those outlined herein.

Table 3-4. Mishaps Rates for Primary Aircraft

Aircraft	Mishaps per 100,000 flying hours				
	Class A Mishap	Class B Mishap	Aircraft Destroyed	Pilot Fatalities	Overall Fatalities
F-16	1.83	1.27	1.41	0.33	0.52
F-15	0.70	3.32	0.85	0.28	0.38
F-22	5.38	11.12	1.08	0.36	0.72
T-38	0.69	1.09	0.59	0.20	0.20
A-10	0.55	6.54	0.55	0.00	0.00

Source: USAF 2019b.

3.1.2.10 Safety Planning and Awareness Training

Low-altitude operations are dynamic and highly demanding. Preflight planning, low-altitude awareness training, and in-flight warning systems make up a three-prong approach to ensure low-altitude training is conducted safely. These components emphasize ground and object avoidance, minimizing head-down-time, and implementing on-board warning systems as fail-safes during low-altitude flight.

Preflight Planning. Before each low-level training mission, pilots conduct preflight checks, mission planning and briefing. Two key components of flight preparation for low-altitude operations are route planning and map study. During route planning the pilot determines turnpoints, key references, lines of communication, restricted fire areas, minimum risk routes, and airspace coordination areas. As low-altitude flight does not allow for a considerable amount of head-down time, the memorization of flight routing along with known tactical reference points aids in in-flight navigation and mission safety. During map study - terrain, obstacle elevations,

geographic funneling features, and areas for terrain masking are reviewed. Pilots identify terrain features that are evident and can serve as a stake in the ground for orientation (e.g., a mountain, a large lake, dry lake bed, large intersection). Then a pilot identifies funneling features from these elements to help locate a target, turnpoint, or point of interest. This is known as working big to small, where the mountain or lake serves as the big and the funnel features lead to the small.

Low-Altitude Awareness Training. The pilots go through rigorous training emphasizing low-altitude awareness. The pilot develops task management skills that allow for accomplishing the mission while reducing the probability of ground impact. Pilot tasks during low-altitude missions fall into three main groups (1) terrain clearance tasks, (2) other critical tasks, and (3) noncritical tasks. The lower the pilot operates the aircraft, the more time the pilot focuses on terrain clearance. Terrain clearance becomes a noncritical task only when leaving the low-altitude environment. The following are subtasks associated with terrain clearance.

- **Aircraft Control.** Control of the aircraft is paramount. Without aircraft control, every other task is meaningless.
- **Altitude Control.** Altitude control establishes the time available for a task. Consideration should be given to climbing to a higher altitude if a task is going to require significant head-down time.
- **Vector Control.** Head-down time can also be increased if there is a positive vector away from the ground and terrain clearance can be assured.

Because of the demanding nature of the low-altitude arena, becoming overtasked (i.e., task saturation) will occur at some point in time. Pilots are trained to recognize task saturation and act to reduce it. Pilots are also conditioned to develop a mental and physical cross-check that establishes acceptable terrain clearance and determines time available for other tasks.

3.1.3 Significance Criteria

Effects to civilian airspace use and management would be less than significant unless the Proposed Action would (1) result in violation of FAA (FAA Order 7400.2, FAA 2019a) or DOD criteria (AFI 13-201); (2) undermine the safety of military, commercial or civil aviation; or (3) cause conflicts, congestion, or delays for a substantial number of non-participating aircraft. CEQ regulation (40 CFR 1508.27) direct that significance criteria are to be used as a guide, as significance must take into consideration the context and intensity of the Proposed Action. The airspace significance criteria present the context and intensity relative to regulations and guidance, safety, and general aviation use of airspace.

3.1.4 Environmental Consequences of the Proposed Action

The Proposed Action would have less than significant effects to airspace use and management. There would be less than significant adverse effects in the form of conflicts, congestion, or delays

to non-participating aircraft. The Proposed Action would not (1) result in violation of FAA or DOD criteria or any state or federal law; (2) undermine the safety of military, commercial or civil aviation; or (3) cause conflicts, congestion, or delays for an appreciable number of non-participating aircraft.

3.1.4.1 Air Traffic

Table 3-5 outlines the number of flights that could be affected by the Proposed Action. An estimated number of approximately 2,300 flights could be affected annually by the Proposed Action. This represents approximately 16 percent of the non-military flights that currently traverse the proposed airspace. VFR traffic that chooses to fly through an active MOA and IFR traffic that are allowed to fly through an active MOA would be unaffected by the Proposed Action.

The Proposed Action could affect approximately 1,300 VFR flights; half of which currently traverse the area where the Evers North, Center and South MOAs would be established. A small percentage of VFR traffic would be expected to fly in the proposed airspace above 10,000 ft above MSL because of oxygen requirements and aircraft performance limitations. Based on membership surveys conducted by the Aircraft Owners and Pilots Association[3] that 39 percent of pilots fly above 10,000 ft and 40 percent of aircraft operate under VFR (FAA 2018), it can be extrapolated that approximately 15.6 percent of VFR flights above 10,000 ft above MSL could be affected by the Proposed Action. Non-participating VFR aircraft can operate in an active MOA while using see-and-avoid flight procedures to avoid military training activities.

The Proposed Action could affect approximately1,000 IFR flights; most of which currently traverse the area where the Evers North, Center and South MOAs would be established. Based on 90 percent of non-participating IFR aircraft conducting operations between 9:00 a.m. and 10:00 p.m. (FAA 2018, standard peak usage hours for IFR traffic of 4,417 hours per year), 60 percent of non-participating aircraft operating IFR (FAA 2018), and the proposed SUA activation times, it can be extrapolated that approximately 12 percent of IFR flights could be affected by the Proposed Action. Civilian aircraft operating under IFR are allowed to fly through active MOAs if minimum IFR separation distances can be provided by ATC and procedures are established in a letter of agreement.

[3] https://www.ainonline.com/aviation-news/business-aviation/2019-08-21/aopa-asks-faa-weigh-supersonic-limits-below-fl180

Table 3-5. Flights Potentially Affected by Proposed Action

Function	Low MOA Airspace	High MOA Airspace	Total
Existing Aircraft (aircraft per year)	4,200	13,100	17,000
Existing Military Aircraft (aircraft per year)	1,300	1,300	2,600
Non-Military Traffic (aircraft per year)	2,900	11,800	14,700
Non-Military VFR Traffic (aircraft per year)	1,200	4,700	5,900
Non-Military IFR Traffic (aircraft per year)	1,800	7,000	8,800
VFR Flights Affected (aircraft per year)	600	700	1,300
IFR Flights Affected (aircraft per year)	200	800	1,000
Total Flights Affected (aircraft per year)	800	1,500	2,300

Sources: FAA 2018, https://eaa1361.org/wp-content/uploads/2019/03/AOPA-SUA-Survey-2019.pdf.

This assessment assumes (1) 5 percent of the aircraft would traverse both the high and low airspaces, all military aircraft will utilize both altitude blocks, (2) 40 percent of non-participating aircraft would be operating VFR (FAA 2018), (3) 50 percent of pilots flying VFR would choose to avoid the Low MOA airspace based on charted activation times (AOPA 2019), (4) 15.6 percent of VFR pilots flying in the High MOA airspace (see Footnote 3), and (5) 90 percent of non-participating aircraft would conduct operations between 9:00 a.m. and 10:00 p.m. (FAA 2018).

Because VFR aircraft are not required to maintain radio and radar contact with air traffic control at lower altitudes, the actual number of VFR aircraft potentially flying through the proposed SUA is unattainable. This EA approximates the percentage of VFR aircraft affected to be 50% based on a 2019 AOPA national survey which had limited responses. Although this survey provides good insight to how the respondents operate in the National Airspace System, this survey is not directly related to the proposed airspace. This assessment was not designed to provided exact numbers, but to provide a rough-order-of-magnitude estimate of the number of aircraft potentially effected to determine the effects under NEPA.

Table 3-6 outlines potential effects from establishing the Evers MOA Complex on existing air traffic. Effects to individual flights would vary, ranging from inconveniences like additional flight planning, to effects such as operating with an elevated risk of conflict with military training operations. The proposed airspace has approximately 14,700 non-military aircraft transiting it each year and approximately 17.7 percent of the flights could be affected by the Proposed Action.

The following management actions and special operating procedures would be implemented:

- Military aircraft training in the proposed Evers MOA Complex would maintain contact with the controlling agency to ensure proper separation with all non-participating aircraft.
- The proposed MOAs would only be activated and used during visual meteorological conditions (VMC), whereas VFR flight rules would always be permitted. Pilots would always have sufficient visibility to maintain visual separation from terrain and other aircraft during approach and departure from the airports.

- Military safety officers would continue to utilize the Mid-Air Collision and Avoidance (MACA) educational and outreach program to conduct public awareness and outreach.
- Upon request from the FAA or airports affected, written procedures could be established (per FAA JO 7400.2) to ensure proper IFR separation.

Table 3-6. Potential Effects to Aircraft and Airports

Evers North, Center and South MOAs and ROI		
IFR Aircraft (851 annual operations potentially affected)	**VFR Aircraft (737 annual operations potentially affected)**	**Airports (20 Public and Private Airports)**
• Pilots may need additional flight planning to determine activation status of MOA. • Aircraft may need to reroute around or below MOAs when active. • Pilots may have potential conflict to flight plans while in transit due to unanticipated activations of MOA.	• Pilots may have potential conflict to flight plans while in transit due to unanticipated activations of MOA. • Pilots may have to operate with an elevated risk of conflict with military training operations – particularly at very low altitudes. • Pilots may have to operate see-and-avoid at elevated awareness levels.	• The airports under this MOA are uncontrolled airfields (no control tower operations).
Evers Low MOA and Evers East MOA		
IFR Aircraft (213 annual operations potentially affected)	**VFR Aircraft (830 annual operations potentially affected)**	**Airports (4 Private Airports)**
• If departing under instrument meteorological conditions, IFR clearance must be obtained on the ground prior to take off via telephone (or radio) with ATC. Once the clearance is obtained, the pilot can depart on an IFR clearance.	All effects listed above • There could be a potential decrease in communication and safety than at higher altitudes • Pilots may display unwillingness to take-off or land from airports or airfield surrounded by low-level MOAs. • Pilots may operate at times with the potential for limited line-of-site from mountainous terrain.	The private airfields under this MOA are uncontrolled airfields (no control tower operations).

3.1.4.2 Airports

There are four private airports beneath the proposed Evers Low and Evers East MOAs including: Deer Creek Farm Airport, GBO Airport, Hannah Field Airport and Singleton Airport (Figure 3-8). All are private airfields and VFR-only. Three of the airports are beneath the existing Evers MOA and no change in flight operations would be expected from existing conditions. Hannah Field and Singleton are on the eastern edge of the proposed airspace, and flights to the south or east of these airports could be affected. Pilots would fly VFR through or below the MOA for a western or northern destination or would be revectored around the proposed MOAs. This would add an additional 5 to 13 NM of transit depending on the airport and direction of travel. Flights to and from GBO and Deer Creek would require flying below 1,000 ft AGL or VFR through MOA when active. The travel distance through or under the proposed MOA would be between 9 and 25

NM depending on the airport and direction of travel. Table 3-6 outlines some of the potential effects from establishing the Evers MOA Complex above airports. Other effects to aircraft using these airports may include the need to operate with limited line-of-site when below the low MOA in mountainous terrain, and interference with radar and radio communication with ATC and other aircraft. These effects would be to individual aircraft that currently fly unimpeded; however, due to the limited number of air operations at these airports, the overall effects would be less than significant.

There are 20 public and private airports beneath or within 10 NM of the proposed Evers MOA Complex that are not beneath the proposed Evers Low and Evers East MOAs (Figure 3-8). Additional coordination with pilots using these airports may be necessary. Aircraft utilizing these airports would arrive and depart essentially unimpeded; however, some revectoring may be required during periods when the MOAs are active. These effects would be less than significant.

3.1.4.3 Amateur Rocket Launch Facility

The Proposed Action would not adversely affect the amateur rocket launch facility. The COA (2 NM of the launch facility) is nearby but outside the existing Evers MOA and the proposed Evers Low MOA. There have been no difficulties or conflicts with military training operations in the Evers MOA based on our previous experiences. There would be an overall reduction in aircraft transiting the airspace due to the proposed expansion of the Evers MOA. The prior coordination between the amateur rocket launch facility and the 113 WG scheduling office would further improve coordination to avoid potential impacts.

3.1.4.4 Greenbank Observatory and NRQZ

Based on their response to the IICEP coordination, the GBO identified three concerns related to the expansion of the Evers MOA: (1) the height of the Evers Low MOA, (2) focused noise and safety, and (3) unknown frequency and power level radio transmissions. The height of the Robert C. Byrd Green Bank Telescope (485 ft AGL) and the lower limit of the Evers Low MOA is 1000 ft AGL. This could result in flights 500 ft above the telescope which increases the potential for impacts related to noise and radio transmissions. Noise levels are multiplied due to the accumulated reflection of sound waves by the 2.3-acre collecting area of the Robert C. Byrd Green Bank Telescope. Employees working on the structure may potentially experience physical damage to their hearing or fall due to unanticipated atmospheric and structural disturbance. The sensitive electronic components of the telescope receivers may potentially be overloaded or destroyed by transmissions above certain power levels.

In addressing GBOs concerns, the 113 WG of DCANG would minimize impacts to the GBO through the following accommodations:

1. To minimize noise and radio interference to the GBO, the 113 WG will propose a chart modification to establish a no-fly zone around the GBO facility that has a radius of 2.5 statute miles and a ceiling of 2,500 ft AGL.

2. To address notification requirements requests from GBO, the 113 WG will provide notification to the GBO via email and via telephone of proposed activity every Friday with the proposed flight schedule for the following week. When circumstances warrant, weather changes and/or last-minute changes will be forwarded to the GBO via telephone as soon as practicable but no later than one hour prior to the change actually occurring. The proposed Evers MOA flight information is not inclusive of all possible military overflights.

3. To prohibit 113 WG aircraft using the Evers MOA from targeting the GBO facility intentionally with any electromagnetic pulses.

3.1.4.5 U.S. National Forests

The Virginia Interagency Coordination Center (VICC) is the dispatch center for mobilization of resources from the Bureau of Land Management, USFWS, National Park Service, USDA Forest Service, and Virginia Department of Forestry. Based on comments received during the IICEP process the 113 WG would coordinate with the VICC to ensure deconfliction of any airspace issues associated with wildland fire protection and prescribed burning activities throughout the George Washington, Thomas Jefferson and Monongahela National Forest (Region 8 and 9).

3.1.4.6 Aircraft Mishaps

Table 3-7 outlines the rate of potential mishaps with the Proposed Action based on Air Force-wide mishaps rates for individual aircraft types. Mishap rates shown reflect the air operations in the proposed Evers MOA Complex. Safety of military aircraft operations are described through an aircraft's "mishap rate," which is the number of mishaps per 100,000 flying hours for each aircraft type. Overall, mishaps with and without the Proposed Action would remain small and comparable to Air Force-wide rates. In general, the Proposed Action would provide the ANG additional training options over a broader area reducing the need to compress the required training into the existing Evers MOA. In addition, any air operations conducted in the proposed MOAs would be offset on a one-to-one basis with training in other low airspace - airspace that may include additional travel time and the potential for transit-related mishaps. These effects would be less than significant, as they would not undermine the safety of military, commercial or civil aviation.

Table 3-7. Mishaps Rates for Primary Aircraft

Aircraft	Mishaps per 100,000 flying hours				
	Class A Mishap	Class B Mishap	Aircraft Destroyed	Pilot Fatalities	Overall Fatalities
F-16	1.83	1.27	1.41	0.33	0.52
F-15	0.70	3.32	0.85	0.28	0.38
F-22	5.38	11.12	1.08	0.36	0.72
T-38	0.69	1.09	0.59	0.20	0.20
A-10	0.55	6.54	0.55	0.00	0.00
C-17	0.70	1.13	0.05	0.16	0.21
C-130	0.43	1.98	0.19	0.29	1.40

Source: USAF 2019b.

3.1.4.7 Safety Planning and Awareness Training

Under the Proposed Action, pilots would continue to conduct preflight planning, participate in low-altitude awareness training to ensure low-altitude training is conducted safely. In addition, pilots would continue to follow low-level guidance and remain 1,000 ft above the highest obstacle and 2,000 ft laterally when over congested or populated areas, as well as 500 ft above all known or observed antennas and obstacles (14 CFR § 91.119).

3.1.5 No Action Alternative

The No Action Alternative would have no impacts to airspace use and management. Establishment of the proposed additions to the Evers MOAs and the creation of ATCAAs would not occur. Training would continue at existing levels in the existing Evers MOA and units would continue to have difficulty and delays in gaining access to the airspace at other locations for certain types of training. Airspace management would remain unchanged when compared to existing conditions.

3.2 NOISE

3.2.1 Definition of Resource

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise is often generated by activities essential to a community's quality of life, such as aircraft operations, construction, or vehicular traffic.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz are used to quantify sound frequency. The human ear responds differently to different frequencies. "A-weighing," measured in A-weighted decibels

(dBA), approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their sound levels are provided in Table 3-8.

Table 3-8. Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Jet flyover at 1,000 feet	100	Rock band
Gas lawnmower at 3 feet	90	Food blender at 3 feet
Downtown (large city)	80	Garbage disposal
Heavy traffic at 150 feet	70	Vacuum cleaner at 10 feet
Normal conversation	60	Normal speech at 3 feet
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room

Source: Harris 1998.

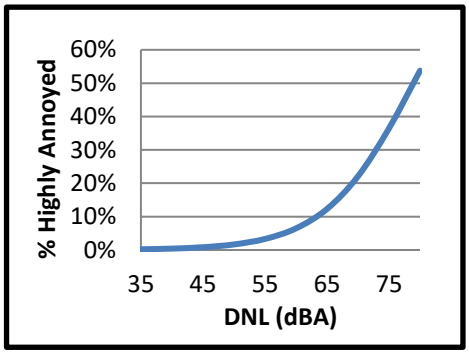
The sound pressure level noise metric describes steady noise levels, although few noises are constant; therefore, additional noise metrics have been developed to describe noise including:

- Maximum Sound Level (L_{max}) – L_{max} is the maximum sound level of an acoustic event in decibels (e.g., when aircraft is directly overhead).
- Equivalent Sound Level (L_{eq}) - L_{eq} is the average sound level in decibels.
- Sound Exposure Level (SEL) – SEL is a measure of the total energy of an acoustic event. It represents the level of a one-second long constant sound that would generate the same energy as the actual time-varying noise event such as an aircraft overflight. SEL provides a measure of the net effect of a single acoustic event, but it does not directly represent the sound level at any given time.
- Day-night Sound Level (DNL) – DNL is the average sound energy in a 24-hour period with penalty added to the nighttime levels. Because of the potential to be particularly intrusive, noise events occurring between 10:00 p.m. and 7:00 a.m. are assessed a 10 dB penalty when calculating DNL. DNL is a useful descriptor for aircraft noise because: (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. DNL provides a measure of the overall acoustical environment, but as with SEL, it does not directly represent the sound level at any given time.
- Onset-Adjusted Monthly DNL (L_{dnmr}) is the average sound energy in a 24-hour period with a 10 dB penalty added to the nighttime levels, and up-to an additional 11 dB penalty for acoustical events with onset rates greater than 15 dB per second, such as high-speed jets operating near the ground. L_{dnmr} is assessed for the month with the highest number of events, and as with DNL and SEL, it does not directly represent the sound level at any given time. Because of the penalties for rapid onset, L_{dnmr} is always equal to or greater than DNL.

- Percent Highly Annoyed (%HA). The concept of long-term annoyance is used to account for all negative aspects of noise, including activity interference, including speech interference and sleep disturbance for nighttime activities, and is the basis for determining impacts due to aircraft noise associated with military and civilian aircraft operations. DNL and L_{dnmr} are highly correlated with and used to determine the %HA (Table 3-9). It is not possible to accurately predict the exact annoyance responses to aircraft noise exposure in any specific community and %HA is not designed to determine exactly how many or which individuals may be annoyed by aircraft noise. Annoyance is reported as the change in the percent of population expected to be highly annoyed, and individuals or populations outlined as highly annoyed within this EA are for reference purposes and to determine the potential for effects.

Table 3-9. Relationship Between Annoyance and DNL

DNL/L_{dnmr} (dBA)	% Highly Annoyed
35	0.2%
40	0.4%
45	0.8%
50	1.7%
55	3.3%
60	6.5%
65	12.3%
70	22.1%
75	36.5%
80	53.7%



Source: USAF 2016.

3.2.1.1 Regulatory Review and Approach

MR_NMAP is the FAA- and DOD-Approved noise model for aircraft operations beneath special use airspace (USAF 2016b and FAA 2015). This noise analysis uses the MR_NMAP (v3.0) as part of the NoiseMAP computer suite to predict noise levels (DNL) associated with aircraft operations beneath the proposed Evers MOA Complex (USAF 2016a). The parameters considered in the modeling included aircraft type, airspeed, power settings, aircraft operations, vertical training profiles, and the time spent within each airspace block.

L_{dnmr} is the accepted noise metric for the ANG when determining noise levels from aircraft operations within SUA; however, DNL is the accepted noise metric for the FAA when determining noise levels from aircraft operations within SUA. MR_NMAP was used to model the overall sound levels with both L_{dnmr} and DNL and both have been carried forwarded for use in this analysis to meet the requirements for both agencies. L_{dnmr} based on the busiest month aircraft operations with rapid onset penalty, whereas DNL is based on annual air operations without rapid onset penalty. Due to the onset penalty and the use of busiest month operations, L_{dnmr} always equals or exceeds DNL.

As the action encompassed an area that is larger than the immediate vicinity of an airport and includes actions above 3,000 ft AGL, the noise analysis includes a discussion on a change-in exposure and examines the change in noise levels as compared to population and demographic information from the U.S. Census blocks. The assessment includes depictions of (1) the population within areas exposed at or above DNL 65 dB, at or above DNL 60 but less than DNL 65 dB, and at or above DNL 45 dB but less than DNL 60 dB has been included in the discussion (FAA 2015).

Since the study encompasses a large geographical area, the effects are of medium intensity over a large area, as opposed to high intensity over a smaller area (e.g., noise near an air installation), change-of-exposure tables were developed to identify where noise will change by 1.5, 3, and 5 dBA (FAA 2015 FAA Order 1050.1F) defines the thresholds for "significant" noise impacts (Exhibit 4-1) and the thresholds for "reportable" noise impacts (Appendix B-1.4). To make certain the ANG is meeting FAA requirements, during the release and transmittal of the Draft EA, the ANG will "report" the greater than 5 dBA day-night Sound Level (DNL) increase to interested parties. In addition, the ANG will include a brief discussion to outline that, as described above, changes in overall noise levels would only introduce a minute incremental changes in the percent highly annoyed for areas under the proposed Evers Low MOA, as the noise in such areas would not normally solicit complaints and noise would be "essentially the least important of various factors" in these areas. In addition, the ANG will outline that the change in noise under the Proposed Action would decrease noise levels by 2.6 to 7.8 dBA DNL throughout 634 square miles (SM) and for individuals beneath the existing Evers MOA.

Supplemental Metrics. Both the USAF and the FAA encourage the inclusion of supplemental noise metrics in the assessment of noise from airspace actions (USAF 2016b and FAA 2015). It is understood that the sole use of DNL and land-use compatibility cannot accurately describe the natural and effects from aircraft noise. This is particularly true for airspace actions which have effects of medium intensity over large geographical areas, as opposed to high-intensity effects over a smaller area (e.g., noise near an airport or air installation). MR_NMAP was used to determine the %HA for each SUA to account for all negative aspects of noise, including activity interference, and speech interference, and was used as an additional basis for determining impacts due to aircraft noise associated with the action. MR_NMAP was also used to calculate L_{max} and SEL for individual overflights, and L_{dnmr} levels and the average daily number of events that would exceed 75 dBA (L_{max}) beneath the proposed Evers MOA Complex. These metrics were used to assess the potential for disturbance to speech, and to provide the public with a better understanding of the specific effects (USAF 2016b and FAA 2015).

3.2.2 Affected Environment

3.2.2.1 Population, Areas, and Sensitive Receptors Beneath the Evers MOA Complex

U.S. Census block data was used to determine the population exposed to aircraft noise. Other than visual counts, this is the narrowest available geo-referenced data set available. The SUA Complex is vast, covering 4,827 SM, and the census block data was appropriate for this scale activity. Table 3-10 and Figure 3-10 outline the population under the proposed Evers MOA Complex. There are approximately 130,000 individuals and 72,000 households beneath the proposed Evers MOA Complex. Notably, the northeast portion of the existing Evers MOA would no longer be under any MOA with the Proposed Action (Figure 2-1).

Table 3-10. Estimated Population Beneath the Proposed Evers MOA Complex

Airspace	Population	Households	Area (SM)
Existing			
Evers Existing	6,990	5,214	634
Proposed			
Evers Low MOA	9,186	9,742	1,270
Evers Center MOA[a]	18,802	10,168	858
Evers South MOA	33,941	18,604	1,260
Evers North MOA	64,180	30,550	1,178
Evers East MOA	3,775	2,549	261
Total[b]	**129,884**	**71,613**	**4,827**

a Does not include population or area included under the Evers Low MOA.
b Does not include the population or area beneath the northeast portion of the existing Evers MOA, which would no longer be under any MOA with the Proposed Action (Refer to Figure 2-1).
Source: U.S. Census Bureau 2018.

3.2.2.2 Existing Background Noise Levels

Background noise levels (L_{eq} and DNL) were estimated for the areas below the proposed SUA Complex using the techniques specified in the American National Standard Institute - Quantities and Procedures for Description and Measurement of Environmental Sound Part 3: Short-term measurements with an observer present (ANSI 2013). Table 3-11 outlines the overall sound levels (i.e., DNL) beneath the proposed Evers MOA Complex without any aircraft activities. Most of the land beneath the proposed SUA Complex is rural; however, there are several small towns and villages. These towns would be relatively quiet, and background sound levels without aircraft would not normally exceed 52 dBA L_{eq} in the daytime, or 44 dBA L_{eq} at night. Background levels would be less than this in rural areas, and appreciably less in remote areas.

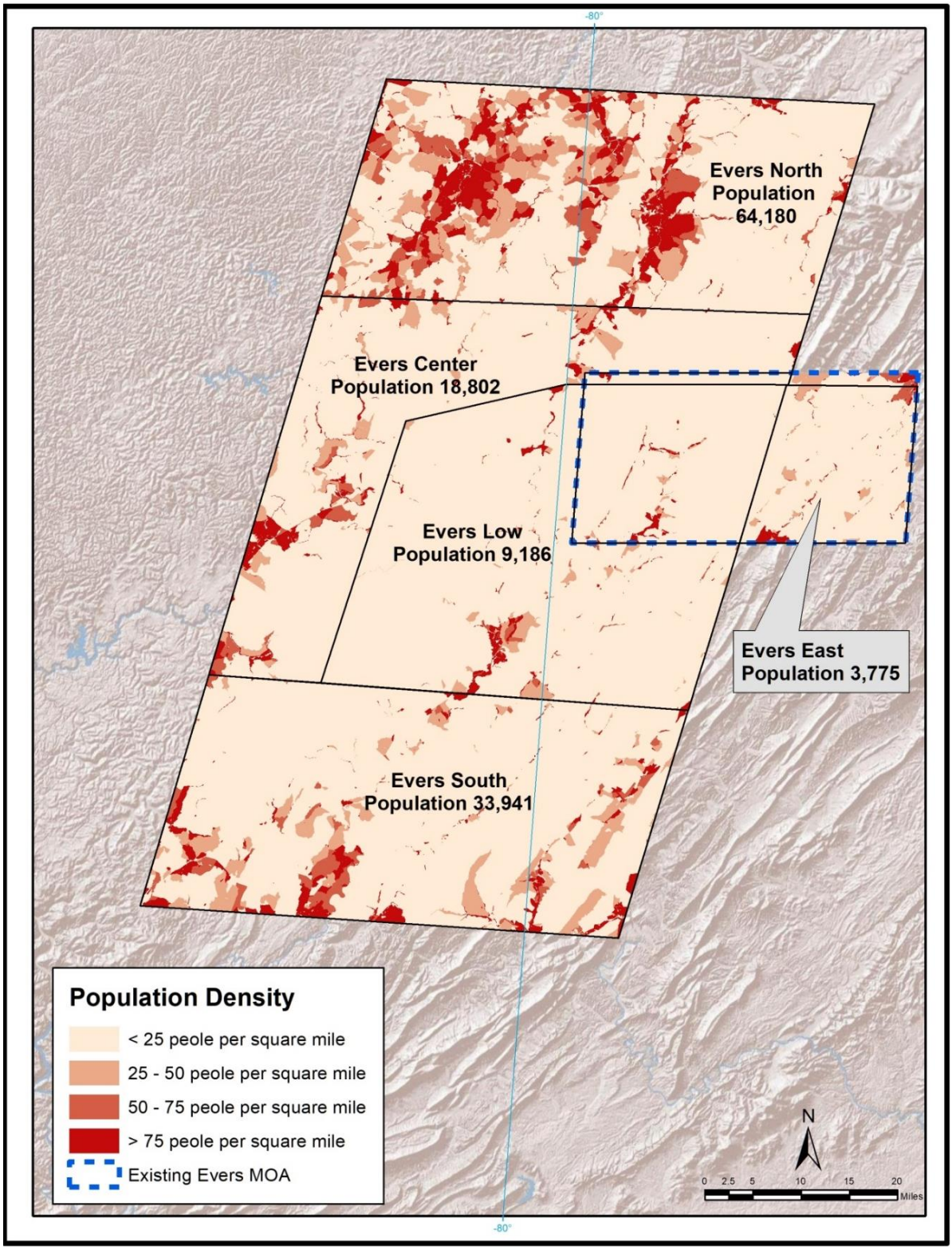


Figure 3-10. Population Density

Table 3-11. Estimated Background Sound Levels

		L_{eq}[dBA]	
Land Use Category	**DNL [dBA]**	**Daytime**	**Nighttime**
Normal suburban residential	52	50	44
Quiet suburban residential	47	45	39
Rural residential	42	40	34
Rural/Remote	<42	<40	<34

Source: ANSI 2013.

3.2.2.3 Existing Overall Aircraft Noise

Table 3-12 outlines the existing overall sound levels (i.e. DNL/L_{dnmr}) beneath the Evers MOA Complex without the Proposed Action. Figure 3-11 outlines the overall sound levels (i.e. L_{dnmr}) beneath the existing Evers MOA with aircraft activities and the remainder of the proposed SUA Complex without any aircraft activities. The estimated DNL ranges from less than 42.0 dBA DNL in rural areas beyond the boundaries of the existing MOA to 49.8 dBA DNL in areas beneath the existing Evers MOA. The estimated L_{dnmr} ranges from less than 42.0 dBA DNL in rural areas beyond the boundaries of the existing MOA to 54.2 dBA DNL in areas beneath the existing Evers MOA. The overall noise from aircraft operations is higher than background levels beneath the existing Evers MOA. These sources are primarily vehicle traffic, but also include industrial sources, construction activities, and lawn equipment.

Table 3-12. Overall Sound Levels and Percent Highly Annoyed - Existing Conditions

Airspace	Population	DNL (dBA)	Ldnmr (dBA)	%Highly Annoyed
Evers MOA	6,990	49.8	54.2	2.9%

Source: USAF 2016a and U.S. Census 2018.
[a] DNL based on actual air operations without rapid onset penalty.
[b] L_{dnmr} based on average busiest month aircraft operations with rapid onset penalty.

Noise from existing aircraft operations does not exceed 65 dBA DNL and is compatible with all land uses. In general, the aircraft operations are spread throughout the 634 SM beneath the existing Evers MOA. Although, the overall noise from aircraft is compatible with all land uses, an estimated 2.9 percent of the population are highly annoyed by the existing aircraft noise under the Evers MOA. Generally speaking, 0.6 percent of individuals are highly annoyed by other sources of noise in rural and remote areas that are void of aircraft operations.

3.2.2.4 Existing Individual Overflight Noise

Although operational noise levels are too low to result in incompatibility with existing land uses, noise from individual overflights generate distinct acoustical events. Table 3-13 outlines the L_{max} and SEL for individual aircraft overflights for the primary users of the existing Evers MOA. Mid- to low-altitude overflights are similar to, but substantially louder than high altitude commercial aircraft overflights. Overflights conducted in the mid-level airspaces are clearly audible, sometimes loud, to individuals who are outdoors, and clearly perceptible inside nearby buildings. Effects from mid-level overflights are distributed throughout areas below and adjacent to the

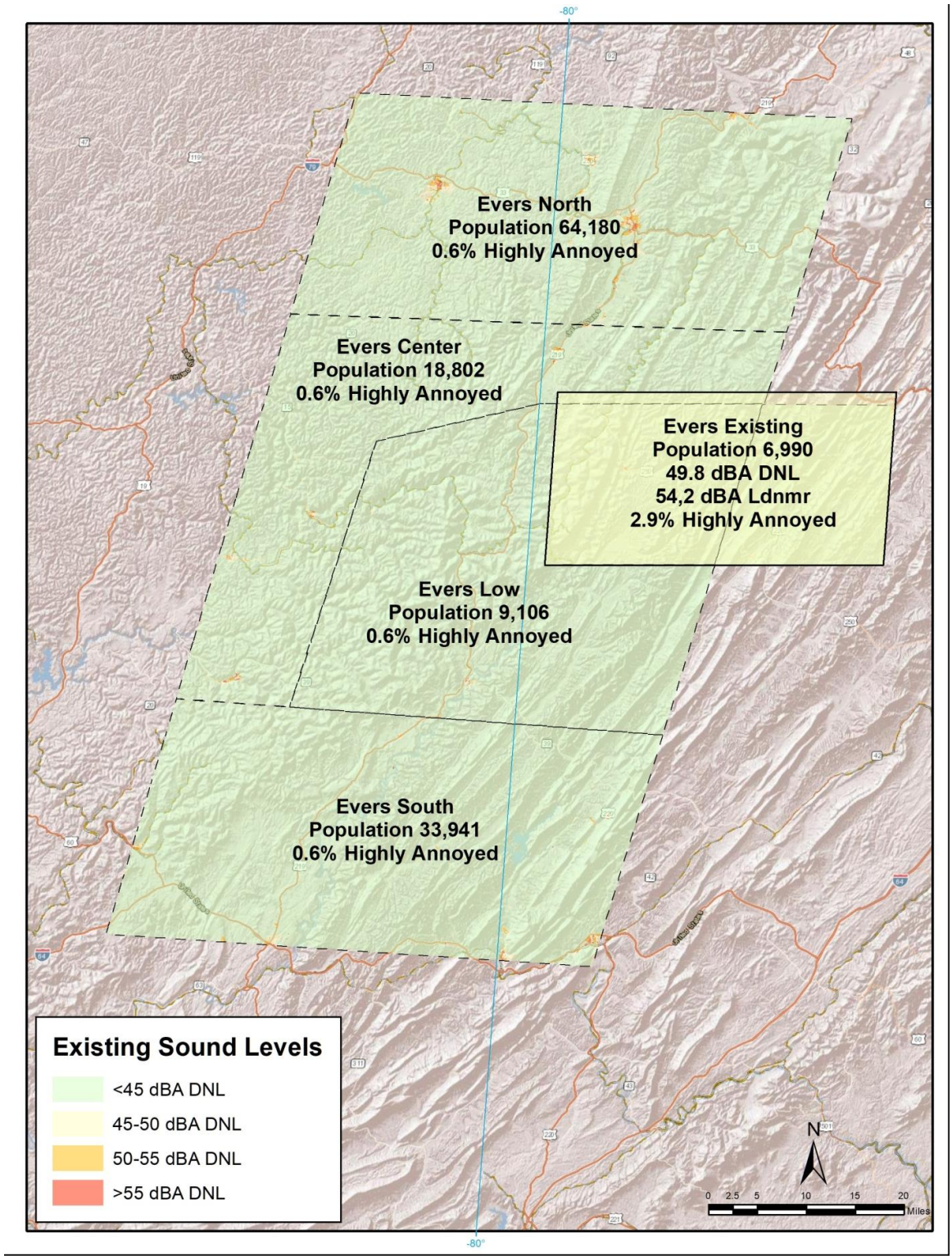


Figure 3-11. Overall Sound Levels and Percent Highly Annoyed - Existing

existing MOA. Overflights conducted in the low-level airspaces are loud, sometimes very loud, to individuals who are outdoors, and clearly audible, sometimes loud inside nearby buildings. These overflights are brief, intermittent, distributed though the MOA, and normally do not occur repeatedly at any one location. Individual overflights would be neither loud enough or frequent enough to highly annoy appreciable percentage of the population or to generate areas of incompatible land-use beneath the existing Evers MOA.

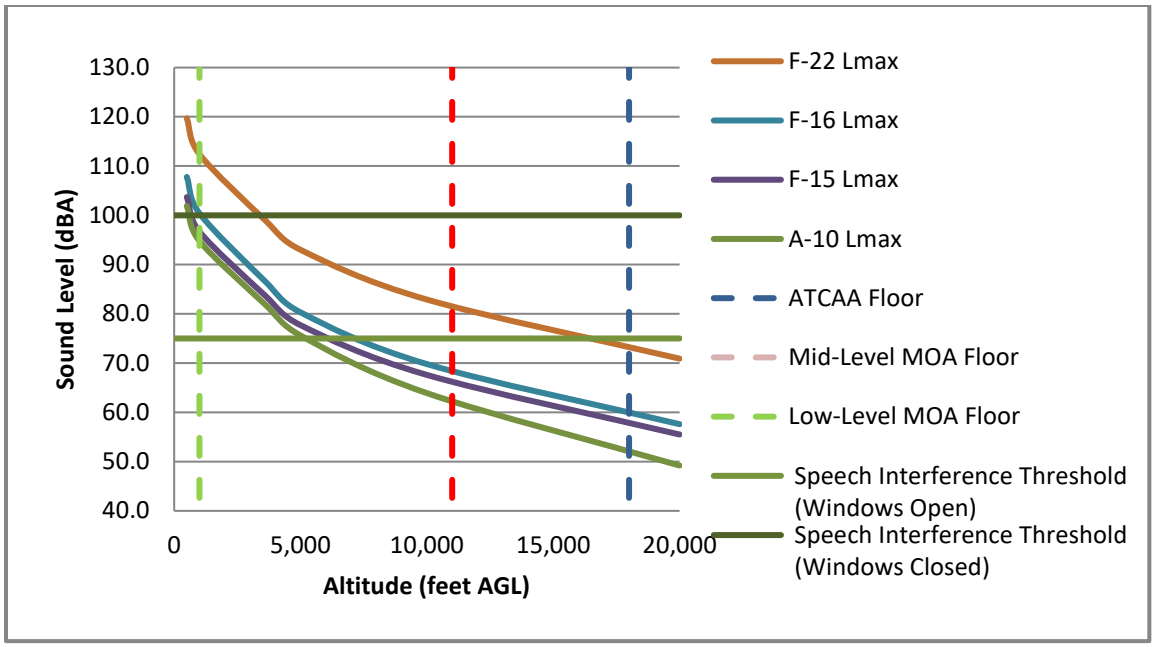
Table 3-13. Estimated Sound Levels for Individual Overflights

Altitude (ft AGL)	L_{max} (dBA)[a]				SEL (dBA)[b]			
	A-10[c]	F-15[d]	F-16[e]	F-22[f]	A-10[c]	F-15[d]	F-16[e]	F-22[f]
1,000	94.8	96.7	100.4	112.4	98.4	103.5	104.9	118.7
5,000	75.6	77.7	80.3	93.0	83.4	88.7	89.0	103.5
10,000	63.9	67.6	69.8	82.9	73.5	80.4	80.3	95.2
20,000	49.2	55.5	57.6	70.9	60.6	70.1	69.8	85.0

Source: USAF 2016a.
Notes:
[a] L_{max} is the maximum sound level during an individual overflight.
[b] SEL is the sound level if the entire overflight was compressed into one second and does not represent the actual noise at any given time.
[c] A-10A operating at 97% Engine Core RPM (NC) at 350 knots.
[d] F-15E operating at 85%NC at 300 knots.
[e] F-16C operating at 90% NC at 450 knots.
[f] F-22 operating at 100% Engine Thrust Ratio (ETR) at 300 knots.

Speech Interference. In general, low- to mid-altitude aircraft overflights can interfere with communication on the ground, and in homes, schools or other buildings directly under their flight path. The disruption of routine activities in the home, such as radio or television listening, telephone use, or family conversation, can give rise to frustration and irritation. The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. The threshold at which aircraft noise may begin to interfere with speech and communication is 75 dBA (DNWG 2009). This level is consistent with, and more conservative than, the thresholds outlined in the American National Standards Institute's *Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools* (ANSI 2010).

Figure 3-12 depicts the L_{max} for individual aircraft overflights for the primary users of the existing Evers MOA. L_{max} at 1,000 ft AGL are 94.8 dBA for an A-10, 96.7 dBA for an F-15, 100.4 dBA for an F-16, and 118.7 for an F-22 (Table 3-13). These sound levels are appreciably louder than the threshold for speech interference, and single A-10, F-15, F-16 or F-22 aircraft operating in the low-level MOAs would interfere with communication for individuals on the ground under their flight path. L_{max} at 10,000 ft AGL are 63.9 dBA for an A-10, 67.6 dBA for an F-15, 69.8 dBA for an F-16, and 82.9 for an F-22, and only F-22 overflights would exceed the threshold for speech interference when operating in the mid-level MOAs. These effects are distributed throughout areas below and adjacent to the areas under the existing Evers MOA.



Source: USAF 2016a and DNWG 2009. Notes: L_{max} is the maximum sound level during the overflight.

Figure 3-12. Estimated L_{max} for Individual Overflights

Table 3-14 outlines the estimated critical distance required for an individual aircraft to interfere with speech, and the lateral distance on the ground from flight track where aircraft interfere with speech. An F-22 operating in the mid- or low-altitude portions of the existing Evers MOA interferes with speech for all individuals within approximately 3.0 miles of the flight track directly below the aircraft. An F-16 operating in the low-altitude portion of the existing Evers MOA interferes with speech for all individuals within approximately 0.9 to 1.3 miles of the flight track directly below the aircraft. An F-15 operating in the low-altitude portion of the existing Evers MOA interferes with speech for all individuals within approximately 0.7 to 1.2 miles of the flight track directly below the aircraft. An A-10 operating in the low-altitude portion of the existing Evers MOA interferes with speech for all individuals within approximately 0.7 to 0.9 miles of the flight track directly below the aircraft. It is possible that some locations experience these events more often others; however, louder events at these locations are offset with a one-to-one reduction in overflights at other locations.

Table 3-14. Lateral Distance from Flight Track for Speech Interference

`	Slant Distance (ft) to Speech Interference Threshold	Overflight Altitude (ft AGL)			
		500	1,000	3,600	5,000
		Lateral Distance from Flight Track for Speech Interference (ft [miles])			
F-22	16,000	15,992 (3.0)	15,969 (3.0)	15,590 (3.0)	15,199 (2.9)
F-16	7,000	6,982 (1.3)	6,928 (1.3)	6,003 (1.1)	4,899 (0.9)
F-15	6,300	6,280 (1.2)	6,220 (1.2)	5,170 (1.0)	3,833 (0.7)
A-10	5,000	4,975 (0.9)	4,899 (0.9)	3,470 (0.7)	

Source: USAF 2016a.

Damage to Hearing. Noise-related hearing loss due to long-term exposure (many years) to continuous noise in the work place has been studied extensively, but there has been little research on the potential for noise induced hearing loss on members of the community from exposure to aircraft noise. Unlike workplace noise, community exposure to aircraft overflights is not continuous, but consists of individual events where the sound level exceeds the background level for a limited time. Over 40 years, an individual would need to be exposed to average sound level of 75 dBA, 8 hours per day for 40 years to experience hearing loss (USEPA 1974 and CHABA 1977). Accordingly, the Occupational Safety & Health Administration (OSHA) and the USAF adopted a threshold of 80 dBA for 8 hours per day as the threshold for hearing protection (USAF 2013). As aircraft overflights are intermittent and not continuous, no individuals are exposed to sound levels exceeding 75 dBA for 8 hours per day beneath the Evers MOA. In addition, OSHA and the NGB adopted a threshold of 140 dB instantaneous noise level as a threshold for short-term exposure that may induce hearing loss. As individual aircraft overflights within the Evers MOA are not supersonic, and do not generate sonic booms above 140 dB, no individuals beneath the SUA Complex are exposed to instantaneous sound levels exceeding 140 dB.

Damage to Structures. Noise from low-level aircraft overflights can cause buildings under their flight path to vibrate, which the occupants experience as shaking of the structure and rattling of the windows. However, based on experimental data and models, noise and vibrations from subsonic aircraft overflights do not cause structural damage to buildings. An impact noise (i.e., blast noise or sonic boom) above 140 dB is required to generate sufficient energy to damage structures (USAF 2016b, Siskind 1989, and Bureau of Mines 1980). Individual overflights within the Evers MOA are not supersonic, and do not generate sonic booms above 140 dB; therefore, there is no potential of damage to structures.

3.2.3 Significance Criteria

Effects to noise would be less than significant unless the Proposed Action would (1) increase noise levels by more than 1.5 dBA DNL in a noise sensitive area exposed to noise above 65 dBA DNL; (2) increase noise levels by greater than 5 dBA DNL over large geographic areas or populations and is determined to be environmentally controversial; or (3) generate individual acoustic events loud enough to damage hearing or structures.

3.2.4 Environmental Consequences of the Proposed Action

The Proposed Action would have the potential for long-term minor adverse effects on the noise environment. Effects would be due to noise from the introduction of low- to mid-altitude military overflights in areas beneath the proposed Evers Low MOA. The Proposed Action would not increase noise levels by more than 1.5 dBA DNL in a noise sensitive area that is exposed to noise above 65 dBA DNL or generate individual acoustic events loud enough to damage hearing or structures. The Proposed Action would increase noise levels by 5.2 dBA DNL and percent highly

annoyed by 0.8 percent beneath the proposed Evers Low MOA in areas not currently within the existing Evers MOA. There would be appreciable decreases (4.3 to 10.8 dBA DNL) in noise and corresponding decrease in the percent highly annoyed under the existing Evers MOA. Overall, there would be no change in the total number of individuals highly annoyed by aircraft. Regardless of any decreases in noise in the existing MOA, individuals experiencing a higher noise levels within the proposed low would still be affected by the Proposed Action.

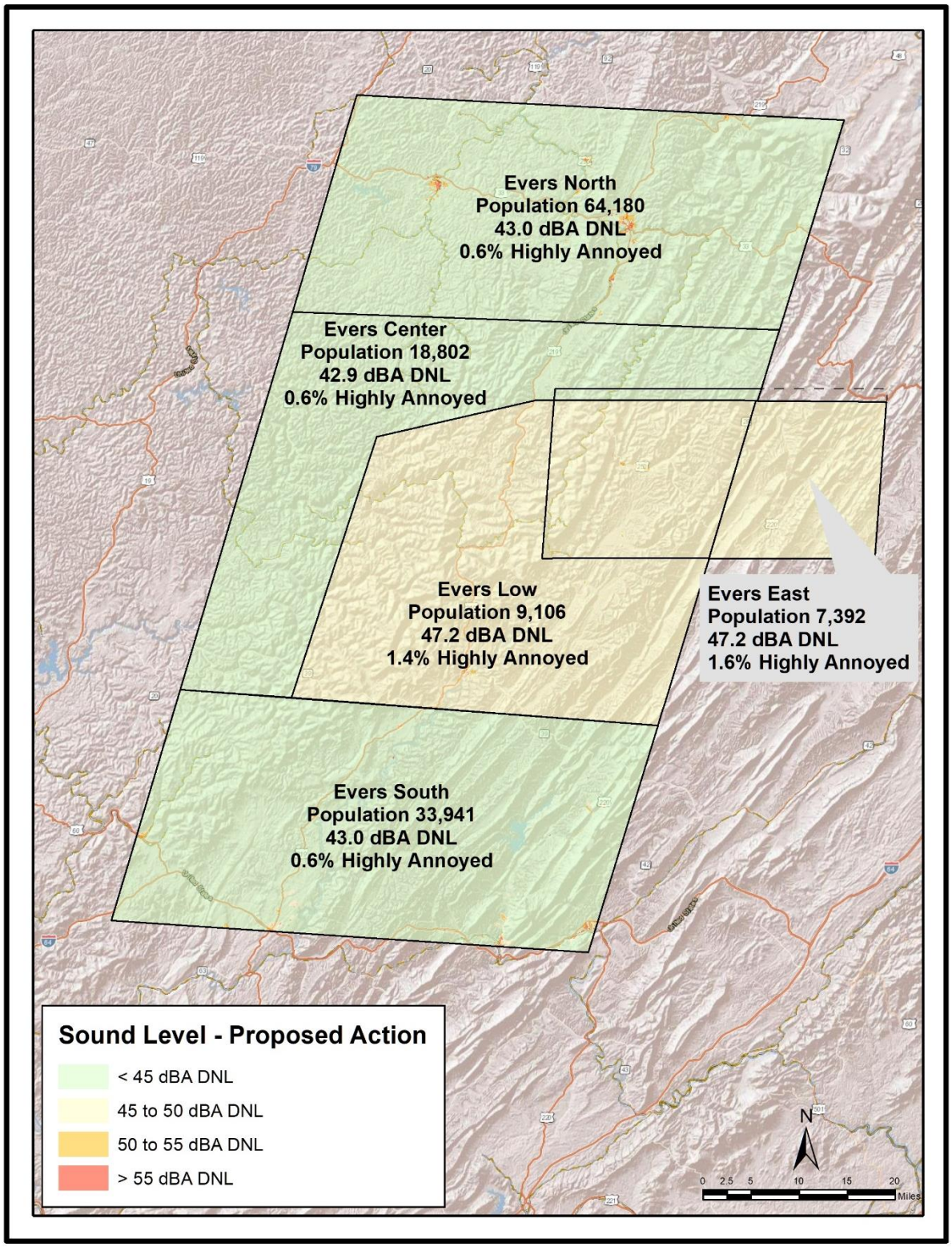
3.2.4.1 Overall Aircraft Noise

Table 3-15, Figure 3-13, and Figure 3-14 summarize the overall noise levels (i.e. DNL) beneath the Evers MOA Complex with the implementation of the Proposed Action and their change when compared to existing conditions. To meet both ANG and FAA criteria, noise modeling was performed to determine both L_{dnmr} and DNL. The estimated DNL (i.e., average annual noise) would range from 42.9 dBA in areas beneath mid-altitude MOAs to 47.2 dBA in the low-altitude training areas. The estimated Ldnmr (i.e., busiest month noise) would range from 43.8 dBA in areas beneath mid-altitude MOAs to 49.6 dBA in the low-altitude training areas. The overall noise environment would be similar to but slightly greater than background levels in most areas beneath the existing and proposed SUAs.

Table 3-15. Overall Sound Levels and Percent Highly Annoyed - Proposed Action

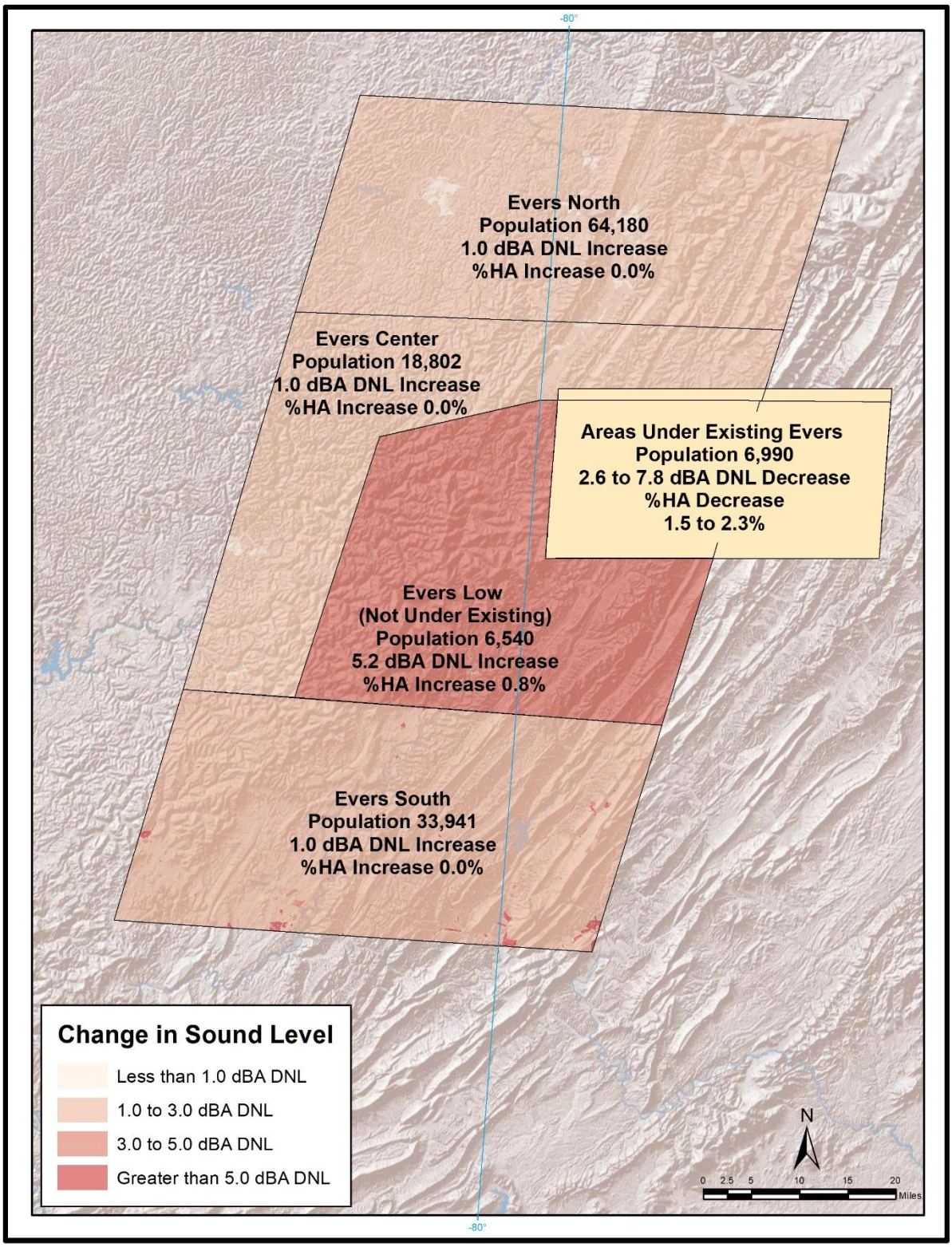
	Existing			Proposed			Change from Existing		
Airspace	DNL (dBA)	L_{dnmr} (dBA)	%Highly Annoyed	DNL (dBA)	L_{dnmr} (dBA)	%Highly Annoyed	DNL (dBA)	L_{dnmr} (dBA)	%Highly Annoyed
Evers Low MOA (under existing MOA)	49.8	54.2	2.9%	47.2	49.5	1.4%	-2.6	-4.6	-1.5%
Evers Low MOA (not under existing MOA)	42.0	42.0	0.6%	47.2	49.5	1.4%	5.2	7.5	0.8%
Evers Center MOA (under existing MOA)	49.8	54.2	2.9%	42.9	43.8	0.6%	-6.9	-10.4	-2.3%
Evers Center MOA (not under existing MOA)	42.0	42.0	0.6%	42.9	43.8	0.6%	0.9	1.8	0.0%
Evers South MOA	42.0	42.0	0.6%	43.0	43.9	0.6%	1.0	1.9	0.0%
Evers North MOA	42.0	42.0	0.6%	43.0	43.9	0.6%	1.0	1.9	0.0%
Evers East MOA	49.8	54.2	2.9%	47.2	49.6	1.6%	-2.6	-4.6	-1.3%
Areas no longer under MOA	49.8	54.2	2.9%	42.0	42.0	0.6%	-7.8	-12.2	-2.3%
		Total	1.1%		Total	0.7%		Total	-0.4%

Source: US Census 2018 and USAF 2016a.
[a] DNL based on actual aircraft operations without rapid onset penalty.
[b] L_{dnmr} based on average busiest month aircraft operations with rapid onset penalty.



Source: USAF 2016 and US Census Bureau 2018.

Figure 3-13. Overall Sound Levels and Percent Highly Annoyed - Proposed Action



Source: USAF 2016 and US Census 2018.

Figure 3-14. Change in Overall Sound Levels - Proposed Action vs. Existing

Land Use Compatibility. Noise from aircraft operations under the Proposed Action would not exceed 65 dBA DNL and would be compatible with all land uses. These effects would be less than significant (USAF 2016b and FAA 2015). This includes being compatible with wilderness area, residential area, church, school, and recreational area guidelines beneath the proposed airspace. These effects would be less than significant.

Change in Overall Noise. The overall noise from aircraft operations would (1) blend with background levels beneath the proposed Evers South, Evers Center, and Evers North MOAs; (2) would be lower than existing levels in areas beneath the existing Evers MOA; and (3) be higher than existing levels in areas beneath the proposed Evers Low MOA in areas not currently within the existing Evers MOA. The Proposed Action would increase noise levels by 5.2 dBA DNL throughout 943 square miles and for 6,540 individuals beneath the proposed Evers Low MOA in areas not currently within the existing Evers MOA. The Proposed Action would decrease noise levels by 4.6 to 12.2 dBA DNL throughout 634 square miles and for 6,990 individuals beneath the existing Evers MOA.

Effects of Noise on Individuals. Although, the overall noise from aircraft is compatible with all land uses, the %HA under the Proposed Action would range from 0.6 percent to 1.4 percent for areas beneath the proposed MOAs. Due to the redistribution of aircraft operations, there would be a slight reduction (0.4 percent reduction) in the overall %HA of for all areas under the Evers MOA Complex when compared to existing conditions. Generally speaking, 0.6 percent of individuals are highly annoyed by other sources of noise in rural and remote areas that are void of aircraft operations.

The %HA, when compared to existing conditions would range from a decrease of 1.5 to 2.5 percent beneath the existing Evers MOA to an increase of 0.8 percent in areas beneath the proposed Evers Low MOA in areas that are not currently within the existing Evers MOA. This minute level of increase is expected, as at levels below 55 dBA, it takes very large changes in overall noise levels to annoy additional individuals. This is consistent with the 1974 USEPA's *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with and Adequate Margin of Safety* (i.e., The Levels Document) which outlines that community response to changes in noise below 55 dBA would be marginal at best, as the noise in such areas would not normally solicit complaints and noise would be "essentially the least important of various factors" (USEPA 1974). These effects would be less than significant.

Environmental Controversy. FAA Order 1050.1F defines the thresholds for “significant” noise impacts (Exhibit 4-1) and the thresholds for “reportable” noise impacts (Appendix B-1.4). To make certain the ANG is meeting FAA requirements, during the release and transmittal of the Draft EA, the ANG will "report" the greater than 5 dBA day-night Sound Level (DNL) increase to interested parties. In addition, the ANG will include a brief discussion to outline that, as described above, changes in overall noise levels would only introduce a minute incremental

changes in the percent highly annoyed for areas under the proposed Evers Low MOA, as the noise in such areas would not normally solicit complaints and noise would be "essentially the least important of various factors" in these areas. In addition, the ANG will outline that the change in noise under the Proposed Action would decrease noise levels by 2.6 to 7.8 dBA DNL throughout 634 square miles (SM) and for individuals beneath the existing Evers MOA.

During the EA process, through the IICEP effort, the ANG provides opportunities for the public to participate in the NEPA process to promote open communication and improve their decision-making process. Through the IICEP process, the ANG has notified relevant federal, state, and local agencies and allowed them 30 days to make known their environmental concerns specific to the Proposed Action. No correspondences have been received that express appreciable concern to the Proposed Action. However, during this process several responses were received which included request for the draft environmental assessment and requests to ensure noise was assessed within the document. See Appendix A for further information on the IICEP letters.

3.2.4.2 Individual Overflight Noise

The nature and overall levels of noise from individual overflights would be similar to existing conditions. However, under the Proposed Action these effects would extend to all newly proposed SUAs, including Evers Low and Evers East. Areas beneath these proposed MOAs would intermittently experience aircraft overflights that would range from loud to very loud exceeding 75 dBA L_{max} at any given point on the ground. These overflights would continue to be brief, intermittent, distributed though the newly proposed MOA, and normally do not occur repeatedly at any one location. Overflights aircraft within the proposed low-level MOAs would interfere with communication for individuals within approximately one to three miles of the aircraft's flight path. In general, individual overflights would be either loud enough or frequent enough to highly annoy some individuals as outlined above. Some locations would experience these events more often; however, events would be offset with a one-to-one reduction in overflights at other locations.

Damage to Hearing or Structures. As with existing conditions, and for similar reasons, aircraft overflights would not generate individual acoustic events loud enough to damage hearing or structures. These effects would be less than significant.

3.2.5 No Action Alternative

Selecting the No Action Alternative would result in no new or changed effects on the noise environment. The modification and addition to the Evers MOA would not occur. The noise environment would remain unchanged when compared to existing conditions.

3.3 BIOLOGICAL RESOURCES

3.3.1 Definition of Resource

Biological resources include native or naturalized plants and animals and the habitats in which they live, including vegetation; wildlife; and threatened, endangered, or sensitive species in a given area. Biological resources are necessary for ecosystem integrity. The existence and preservation of biological resources are important to society for aesthetic, recreational, and socioeconomic purposes.

Since there will be no ground-disturbing activities, no infrastructure changes, no supersonic flight activities, no release of chaff and flares, no weapons firing, and no ordnance deployment, effects to ground-dwelling wildlife (i.e., reptiles, amphibians, fish, and invertebrates) or their associated habitats from the implementation of the Proposed Action would be nonexistent. In addition, water resources (i.e., wetlands, floodplains, surface waters, groundwater, or wild and scenic rivers) were dismissed from detailed analysis for the same reason.

Threatened, endangered, or sensitive species include plant and animal species listed and proposed for listing by the USFWS under the ESA and by state natural resources agencies. The federal ESA protects endangered and threatened plant and animal species and designated critical habitats, while the Virginia Department of Agriculture and Consumer Services 1979 Endangered Plant and Insect Species Act protects threatened and endangered plant and insect species listed in the Commonwealth of Virginia. West Virginia does not have legislation protecting state listed species. Special status species also include bird species protected under the federal Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act (BGEPA).

3.3.2 Affected Environment

The proposed Evers MOA Complex covers approximately 4,827 SM in West Virginia and Virginia. Public land in the Monongahela and George Washington/Jefferson National Forests provide opportunities for recreational activities. The two National Forests occupy 2,622 SM beneath the Proposed Evers MOA Complex in West Virginia and Virginia (Figure 3-15).

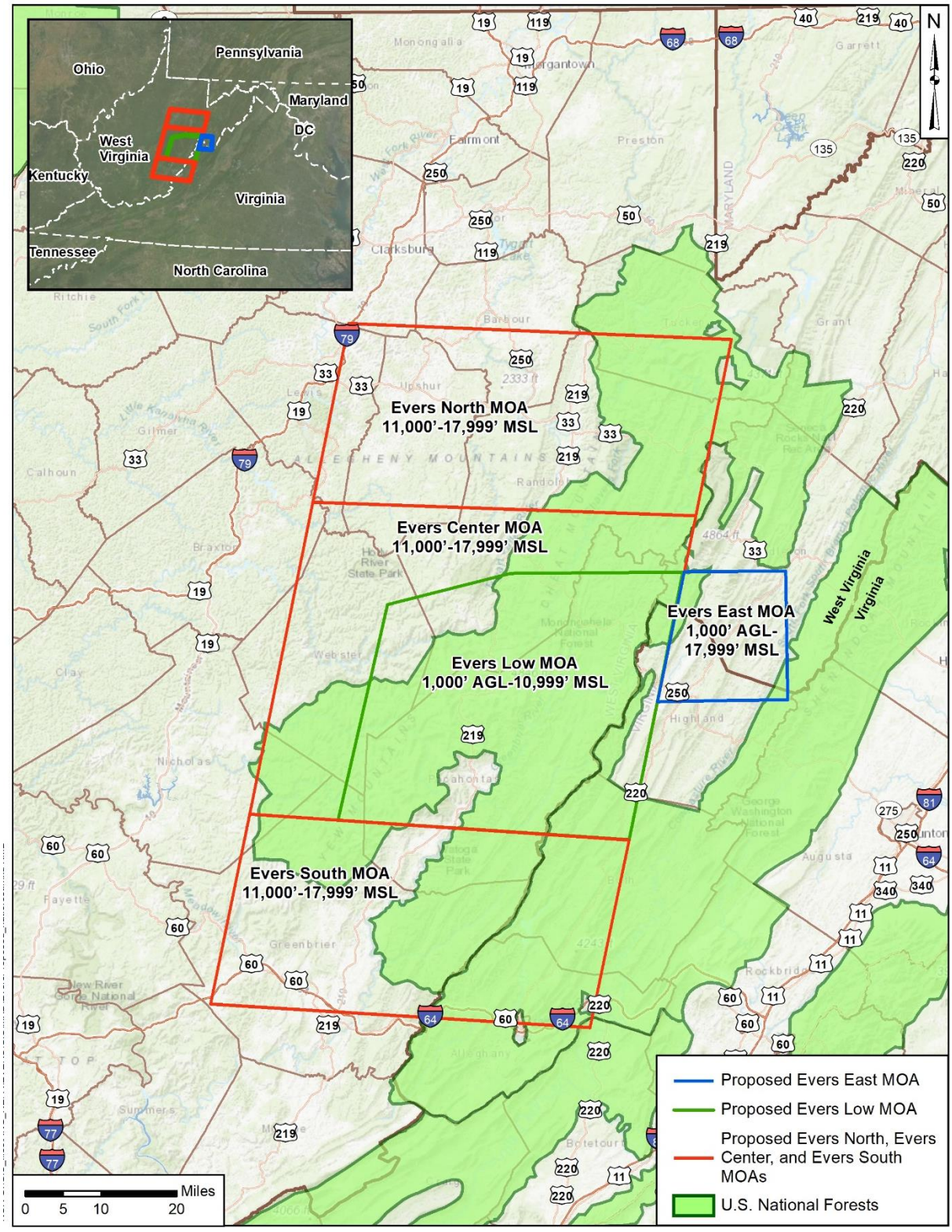


Figure 3-15. National Forest Beneath the Proposed Evers MOA Complex

The rural landscape, woodlands, and wildlife of the Appalachian Mountains are key biological resources. The IICEP response from the Monongahela National Forest (MNF) indicated that all or portions of eight congressionally designated wilderness areas may be within the proposed MOAs. The MNF encompasses more than 921,000 acres in federal ownership in 10 counties of West Virginia. It is the largest expanse of public land in West Virginia and represents 52 percent of the publicly available recreation land in West Virginia. The majority of the MNF is within the counties identified in the proposed MOAs (Appendix A).

3.3.2.1 Land Cover Types

The proposed Evers MOA lies over the Appalachian Mountains and parts of West Virginia and Virginia. Land cover beneath the proposed Evers MOA covers a total of approximately 4,827 SM and may be grouped into seven generalized categories according to the National Land Cover Database (MRLC 2018) (Figure 3-16). The area is primarily forest (87 percent), pastures (7 percent), and developed land (4 percent). The remaining 2 percent of land cover is comprised of water, barren land, grasslands, and wetlands. Forests contain a diverse selection of deciduous and mixed evergreen-deciduous woodlands dominated by species including red oak (*Quercus rubra*), black oak (*Quercus velutina*), white oak (*Quercus alba*), bitternut hickory (*Carya cordiformis*), red maple (*Acer rubrum*), yellow-poplar (*Liriodendron tulipifera*), and Virginia pine (*Pinus virginiana*) (Morin 2017 and WV DNR 2003c).

3.3.2.2 Wildlife

The forested land in the region beneath the proposed Evers MOA Complex provides habitats for a variety of wildlife. Common mammals found in this region include the eastern cottontail rabbit (*Sylvilagus floridanus*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), white-tailed deer (*Odocoileus virginianus*), Virginia opossum (*Didelphis virginiana*), several species of bat (i.e., *Eptesicus*, *Myotis*, *Nycticeius* spp.), American beaver (*Castor canadensis*), and several species of squirrel including the southern flying squirrel (*Glaucomys volans*). Less common species of mammal in the area include the coyote (*Canis latrans*), black bear (*Ursus americanus*), and bobcat (*Lynx rufus*). Other terrestrial and aquatic species such as the timber rattlesnake (*Crotalus horridus*) and the spotted salamander (*Ambystoma maculatum*) live in the region as well (WV DNR 2003b).

3.3.2.3 Bird-Aircraft Strike Hazard

The DCANG follows the policies and procedures in the Bird/Wildlife Aircraft Strike Hazard (BASH) Plan as put out by order of the Secretary of the Air Force. It implements AFI 91-202, *USAF Mishap Prevention Program*, AFI 91-204, *Safety Investigations and Reports*, and the Air Force Manual 91-223, *Aviation Safety Investigations and Reports*. The BASH Plan applies to all Evers MOA Complex members, Geographically Separated Units, transient/deployed units to the Evers MOA Complex, and its associated training areas and airspace (USAF 2018).

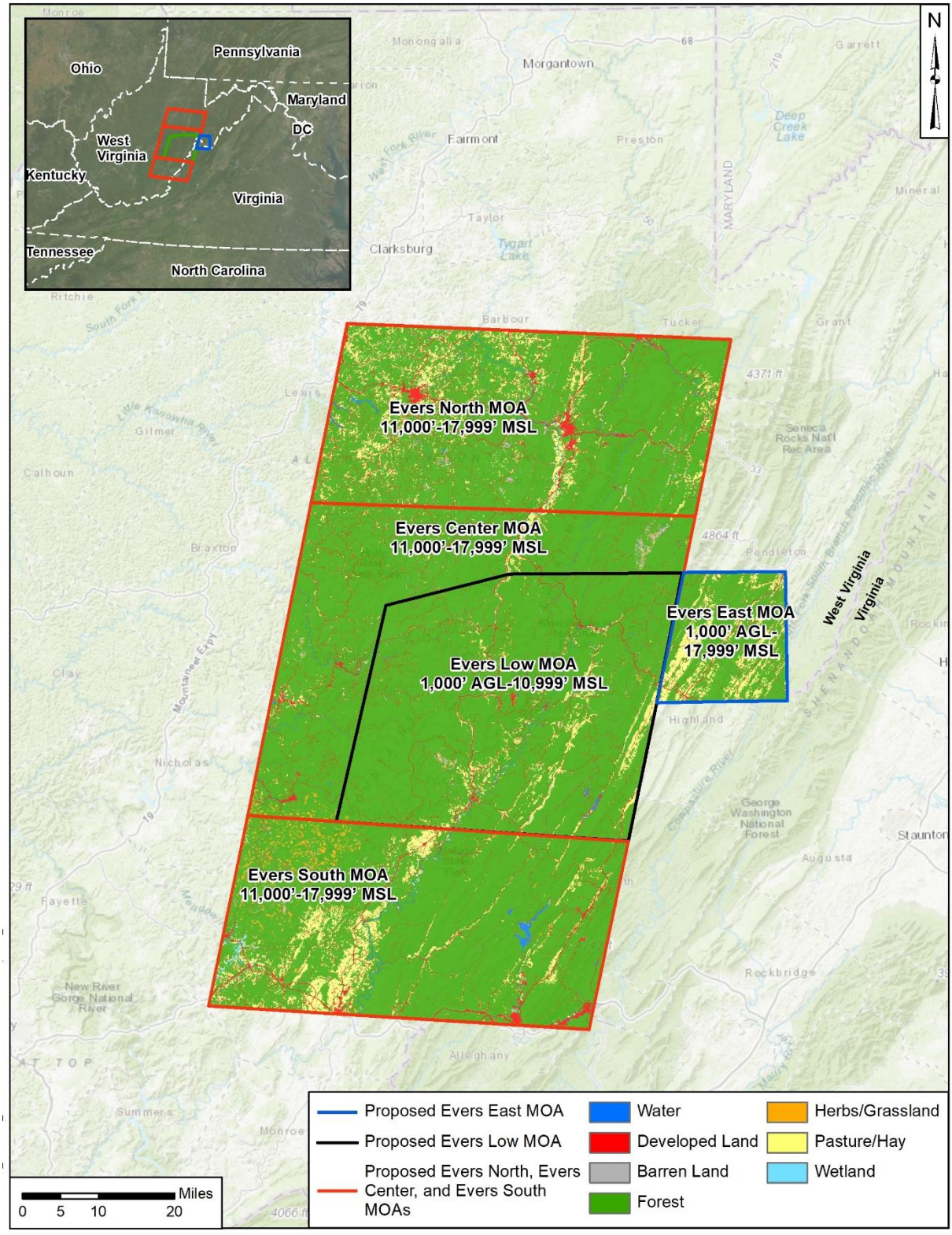


Figure 3-16. Land Cover Beneath the Proposed Evers MOA Complex

The USAF Bird Avoidance Model (BAM) and Avian Hazard Advisory System (AHAS) show the risk of bird hazards for the continental U.S. and Alaska. They use online, near real-time, geographic information system data and data on bird habitat, migration, and breeding characteristics to predict bird movement and the potential risk for bird strikes (USAF 2015). With this information, pilots can informatively schedule flight routes as to minimize the hazard of bird strikes.

Table 3-16 outlines the existing rate of potential bird strikes based on Air Force-wide BASH rates for individual aircraft types as provided from the Air Force Safety Center. Existing mishap rates reflect the air operations in the existing Evers MOA and are differentiated based on altitude blocks. The incidence rate of bird strikes under the existing conditions is low. Overall, existing bird strike rates are small and comparable to USAF-wide rates.

Table 3-16. Bird Strike Rates - Existing Conditions

Altitude Block	Low Level (1,000-11,000)	Mid-Level (11,000-18,000)	High-Level (>FL180)	Total
Training Hours	99.0	147	0.0	246
Strikes Per 100,000 Flying Hours	589.6	5.7	3.0	598

Source: USAF 2019b.

There are four migratory bird flyways recognized in the U.S. that are used during the spring and fall seasons (Figure 3-17). Most of bird migrations occur below 3,000 ft AGL (Lincoln et al. 1998). The Proposed Action lies on the western edge of the Atlantic flyway. Although there is considerable variation, most birds fly below 500 ft AGL except during migration. The AHAS classifies the risk of bird-aircraft strikes in the current Evers MOA Complex as low to moderate during peak spring and fall migration months (USAF 2015).

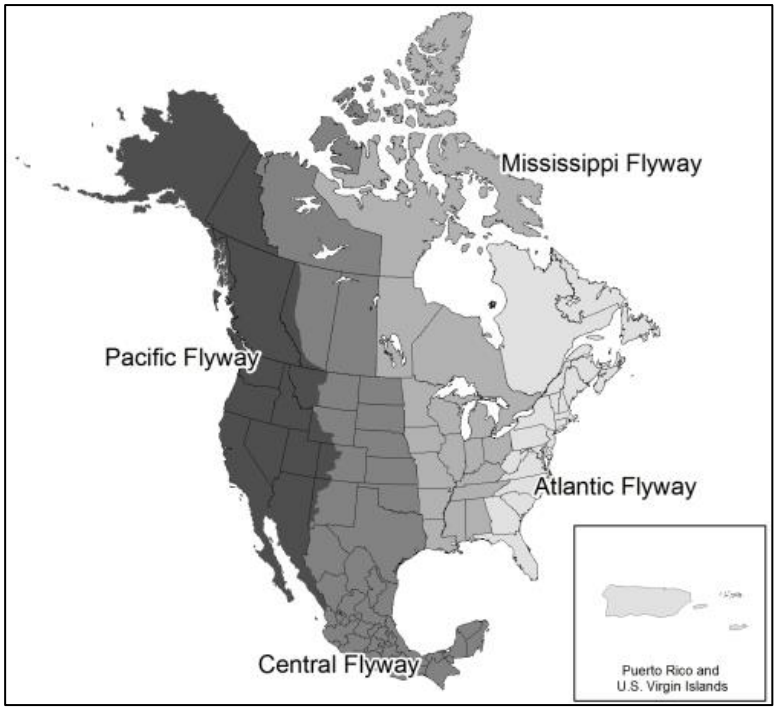


Figure 3-17. Migratory Flyways Over the United States

3.3.2.4 Threatened and Endangered Species

The known or expected range of federally-listed species in the area beneath the proposed Evers MOA Complex includes six plant species and 18 animal species (USFWS 2019a). Animals include four species of bat, one species of salamander, and numerous species of aquatic animals, insects, and isopods. There are no large federally-listed mammals that potentially occur under the proposed Evers MOA Complex (USFWS 2019c). Bat species are described in further detail at the end of this section. Amphibians, insects, and aquatic species are not discussed in detail as the Proposed Action will have negligible effect on them. Two critical habitats, those of the Indiana bat and the Virginia big-eared bat, are located within the region underlying the proposed Evers MOA Complex (USFWS 2019c). Critical habitats are specific geographic areas that contain features essential to the conservation of an endangered or threatened species (USFWS 2018). This federally-listed species and critical habitat data was obtained from USFWS' Information for Planning and Consultation tool (USFWS 2019c).

There are 18 migratory bird species that are known or expected to occur in the area underlying the Proposed Evers MOA Complex. The majority are passerines or near passerines (perching birds). The remaining species include raptors, such as eagles and owls, and a couple of non-passerines (USFWS 2019c). Bald eagles are no longer protected under the ESA and Section 7 consultation with the USFWS is no longer necessary. However, the bald eagle remains protected under the BGEPA.

The known or expected range of state-listed species in the area underlying the proposed Evers MOA Complex includes six plant species and 18 animal species. The majority of all state-listed species overlap with the federally-listed species with a couple discrepancies. There are no state-listed large mammals that potentially occur under the Proposed Evers MOA Complex. Table 3-17 lists the federal and state listed species in the region underlying the Proposed Evers MOA Complex.

Table 3-17. Federally and State Listed Threatened and Endangered Species Beneath the Proposed Evers MOA Complex

Common Name	Scientific Name	Federal Status	State Status
Gray bat	*Myotis grisescens*	E	E
Indiana bat	*Myotis sodalist*	E	E
Northern long-eared bat	*Myotis septentrionalis*	T	T
Virginia big-eared bat	*Corynorhinus townsendii virginanus*	E	E
Red knot	*Calidris canatus rufa*	T	T
Cheat mountain salamander	*Plethodon nettingi*	T	T
Candy darter	*Etheostoma osburni*	E	E
Diamond darter	*Crystallaria cincotta*	E	E
Atlantic pigtoe	*Fusconaia*	PT	PT
Clubshell	*Pleurobema clava*	E	E
Fanshell	*Cyprogenia stegaria*	E	E

Common Name	Scientific Name	Federal Status	State Status
James spinymussel	*Pleurobema collina*	E	E
Northern riffleshell	*Epioblasma torulosa rangiana*	E	E
Pink mucket	*Lampsilis abrupta*	E	E
Rayed bean	*Villosa fabalis*	E	E
Sheepnose mussel	*Plethobasus cyphus*	E	
Snuffbox mussel	*Epioblasma triquetra*	E	E
Spectaclecase mussel	*Cumberlandia monodonta*	E	
Tubercled blossom	*Epioblasma torulosa*	E	
Roanoke logperch	*Percina rex*		E
Rusty patched bumblebee	*Bombus affinis*	E	E
Madison cave isopod	*Antrolana lira*		T
Northeastern bulrush	*Scirpus ancistrochaetus*	E	E
Running buffalo clover	*Trifolium stoloniferum*	E	E
Shale barren rock cress	*Arabis serotina*	E	E
Small whorled pogonia	*Isotria medeoloides*	T	T
Smooth coneflower	*Echinacea laevigata*	E	E
Virginia spiraea	*Spiraea virginiana*	T	T

Notes: E= endangered, T-Threatened

A brief description of federally- and state-listed bat and bird species follows:

Gray Bat (*Myotis grisescens*) – The gray bat was listed as federally endangered in 1976 because of human disturbance and habitat loss and degradation. These bats live in caves year-round, hibernating in deep, vertical caves in the winter, and roosting in limestone caves along rivers during the summer. Females give birth to a single pup in late spring. Gray bats are mainly found in limestone karst areas of the southeastern U.S. with some populations also found in parts of the Midwest. They are extremely vulnerable to disturbance due to living in very large numbers in relatively few caves. Human disturbance of hibernating bats, cave flooding, and cave commercialization have all contributed to declining bat numbers. The USFWS has developed a recovery plan to aid the bats' survival (USFWS 2019b).

Indiana Bat (*Myotis sodalist*) – The Indiana bat was listed as federally endangered in 1973 due to disturbance of their hibernation habitats and loss of their summer habitats. These bats hibernate in large numbers in few caves (20,000-50,000 bats per cave), leaving their population vulnerable to disturbance from even a single event. Almost half of all Indiana bats hibernate in southern Indiana with the rest of the population spread out over the eastern half of the United States. Females give birth to a single pup in the spring. In the summer, Indiana bats migrate to wooded areas to roost under the peeling bark of dead and dying trees in groups of 100 or more. Their habitat in the Evers East MOA as well as small adjacent portions in the Evers Low and Center MOAs has been designated as critical (USFWS 2018).

Northern Long-eared Bat (*Myotis septentrionalis*) – The Northern Long-eared bat was federally listed as threatened in 2015 primarily as a result of the disease known as white-nose syndrome. However, other factors such as hibernation disturbance and summer habitat loss are also possible

causes. During the winter, these bats hibernate in caves and mines with constant temperatures, high humidity, and no air currents. In the summer they roost in cavities or crevices of both live and dead trees. The Northern Long-eared bat has a wide range including much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia (USFWS 2019d).

Virginia Big-eared Bat (*Corynorhinus townsendii virginanus*) – The Virginia Big-eared bat was federally listed as endangered in 1979 because of habitat loss and increased human disturbance of maternity roosts and hibernacula. These non-migratory bats inhabit limestone caves year-round in karst regions dominated by oak-hickory or beech-maple-hemlock forests. In the winter they hibernate in cool, well-ventilated areas of caves. In early spring, females congregate in maternity colonies in the warmer parts of the caves and give birth to a single pup. Even slight disturbances of these bat populations can cause adults to abandon caves, abandon young, and force bats to use valuable energy reserves needed to survive hibernation. Two small pockets in the Evers East MOA as well as one small pocket in the Evers North MOA have been designated as critical habitat (USFWS 2011).

Red Knot (*Calidris canutus rufa*) – The rufa subspecies of the red knot was federally-listed as threatened in 2015 and state-listed as endangered due to habitat loss, disruption of predator/prey cycles on nesting grounds, and asynchronies in the timing of the birds' annual migratory cycle relative to favorable food and weather conditions. Red Knots nest in Canada's Arctic region in dry, slightly elevated tundra locations and migrate to the Southeast U.S., and parts of South America in the winter. Red knots use key staging and stopover areas to rest and feed. Major stopover areas for foraging along the U.S. Atlantic coast include the Virginia barrier islands and Delaware Bay. Their migration pathway crosses over the Proposed Evers MOA Complex from May through the end of September (USFWS 2015).

3.3.2.5 Eastern Region Forester Sensitive Species

The lists of eastern region forester sensitive species for the Monongahela National Forest, and the George Washington and Jefferson National Forests are presented in Appendix D. The lists of rare species potentially impacted by the aircraft operation in the proposed Evers MOA Complex are also included in Appendix D.

The eastern region forester sensitive species for the Monongahela National Forest include multiple species of mammals (10), birds (14), reptiles (3), amphibians (3), fishes (8), insects (28), crustaceans (6), bivalves (2), gastropods, (1), other invertebrates (13), vascular plants (69), and non-vascular plants (1). Federally-listed wildlife species potentially occurring under the proposed Evers MOA Complex include three bats and one invertebrate.

The eastern region forester sensitive species for the George Washington and Jefferson National Forests include multiple species of fishes (20), amphibians (8), reptiles (3), birds (1), mammals

(9), gastropods (11), mussels (37), spiders (1), amphipods (7), isopods (3), crayfish (1), other invertebrates (26), vascular plants (53), and non-vascular plants (19). State-listed wildlife species potentially occurring under the proposed Evers MOA Complex include three fishes, two amphibians, three birds, three mammals, four invertebrates, and one vascular plant.

3.3.3 Significance Criteria

The Proposed Action would have significant effects on biological resources if it would reduce the distribution or viability of species or habitats of concern. Determination of the significance of potential impacts to biological resources is based on legal protections provided in the Virginia Department of Agriculture and Consumer Services (the Endangered Plant and Insect Species Act of the Code of Virginia); ESA of 1973 (16 U.S.C. §§ 1531-1544, as amended); Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712 as amended); and BGEPA (16 U.S.C 668-668c, as amended.) The state of West Virginia does not currently have legislation protecting threatened and endangered species. Species listed in the state are those listed federally and are protected by the ESA (WV DNR 2003a).

The Virginia Department of Agriculture and Consumer Services Endangered Plant and Insect Species Act protects and manages endangered and threatened plant and insect species in the Commonwealth of Virginia (VDACS 2019). The federal ESA specifies that effects to biological resources would be considered significant if the Proposed Action or its alternatives would: (1) jeopardize the continued existence of a federally listed threatened or endangered species; or (2) result in the destruction of adverse modification of federally designated critical habitat. The Migratory Bird Treaty Act provides that it is unlawful to take any migratory bird (50 CFR §10.13), or any part, nest, egg of any such bird, unless authorized under a permit issued by the Secretary of the Interior. Take is defined in regulations as: pursue, hunt, shoot, wound, trap, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect. The BGEPA prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles (pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb), including their parts, nests, or eggs. Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, or (3) nest abandonment.

3.3.4 Environmental Consequences of the Proposed Action

The Proposed Action would have less than significant adverse effects to biological resources. These effects could result from direct impacts associated with BASH and indirect impacts associated with noise from aircraft overflights. The land cover beneath the proposed airspace is primarily forest and two national forests cover more than half of the land cover. There would be no ground-disturbing activities, no supersonic flight activities, no weapons firing, and no ordnance deployment within the Proposed Evers MOA Complex. No habitat disturbances would result from

the Proposed Action. Short-term effects would be due to increases in aircraft overflight noise during training exercises. These effects would cease and return to existing conditions during periods when aircraft are not periodically flying overhead. Long-term effects would be similar in nature and overall level as the short-term effects. The Proposed Action would not reduce the distribution or viability of species or habitats of concern; jeopardize the continued existence of a federally listed threatened or endangered species; or result in the destruction or adverse modification of federally designated critical habitat. In addition, the Proposed Action would not disturb a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle, a decrease in its productivity, or nest abandonment.

A scoping letter and description of the Proposed Action was sent to USFWS, Virginia Field Office and West Virginia field Office, in which ANG requested assistance in identifying any potential issues related to the proposal, and concurrence for "no effect" upon federally-listed species. The USFWS coordination letters are provided in Appendix A**.** Based on the analysis and regulatory coordination contained in this EA, the Proposed Action would not reduce the distribution or viability of species or habitats of concern or violate biological resources laws or regulations.

3.3.4.1 Noise Effects on Wildlife

The noise analysis conducted for the Proposed Action (Section 3.2) indicated that the overall noise levels from aircraft would exceed existing levels in some areas but would not exceed 65 dBA DNL and would be compatible with all land uses. Noises from individual overflights would generate distinct acoustical events; maximum sound level associated with individual overflights could exceed 75 dBA L_{max}. As the air operations would be distributed throughout the proposed Evers MOA Complex, noise from individual overflights would occur a small percentage of the time. It is possible that some locations could experience these events more often; however, events would be offset with a one-to-one reduction in overflights at other locations. It should be noted that the floor of 1,000 ft AGL is proposed only for the Evers East MOA and the Evers Low MOA; the range of noise would be 42.9 to 47.2 dBA DNL. The remaining MOAs have a proposed floor of 11,000 ft MSL. Noise generated from overflights at this altitude would be approximately 43.0 dBA DNL and 44 L_{dnmr}, considerably lower than the range of noise from aircraft flying in the Evers East and Low MOAs.

Due to the nature of the proposed expansion, overall noise levels from overhead flights are estimated to decrease in some areas. The expansion of the airspace combined with the currently enacted number of flight hours would result in current noise levels spread over a larger area, effectively increasing noise levels in the new proposed Evers MOAs, but decreasing noise levels in the existing Evers MOA. The most significant decrease in noise levels would be in the proposed Evers Center MOA (under existing MOA) which would see a reduction in noise levels by 7.8 dBA DNL (i.e., average annual) and 12.2 dBA L_{dnmr} (average busiest month) (Section 3.2).

Noise effects on wildlife can be classified as hearing, masking, physiological, or behavioral (Dufour 1980). Wildlife could habituate to repeated exposure to aircraft noise; however, habituation (i.e., the diminishing of a physiological or emotional response to a frequently repeated stimulus) seems unlikely given the widely dispersed nature of aircraft operations and the infrequency of the activities. The potential noise impacts on wildlife from such events would be limited to startle (behavioral) responses to the sporadic noise events with a subsequent return to normal behavior (Dufour 1980).

There are two bald eagle nest locations under each of the proposed Evers Low MOA and Evers East MOA (Figure 3-18). The noise level increase from the Proposed Action above the nest locations would be 5.2 dBA DNL above the estimated background noise level of 42 dBA DNL (see Table 3-11). Avoidance of low-level flights to the maximum extent practicable over noise-sensitive areas such as the eagle nest locations would be emphasized by 113 WG to all flying units during the flight planning stage so as not to appreciably increase the noise environment and avoid the potential for nest disturbance.

There are three bald eagle nest locations under each of the proposed Evers North, Evers Center, and Evers South MOAs. The aircraft operations in these MOAs would be more than 5,000 ft AGL above the nest locations (i.e., the existing number of ft above MSL elevation under the proposed North, Center, and South MOAs would result in flight operations being at least 5,000 ft AGL for a floor altitude of 11,000 ft above MSL) and the noise level increase from the Proposed Action would be 0.9 to 1.0 dBA DNL above the estimated background noise level of 42 dBA DNL (see Table 3-11). Therefore, the Proposed Action would not affect bald eagle nests in these MOAs.

Numerous studies have been conducted to evaluate the impact of aircraft noise and sudden visual appearance of aircraft on wildlife (Dufour 1980). Studies of the noise effects on wildlife have resulted in a wide range of behavioral response ranging from immediate fright response to no visible reaction. Some species appear to be influenced more by sight than by sound of low-flying jet aircraft. Most effects reported in noise-wildlife studies were temporary with no acute (i.e., sudden) effects on reproduction, mortality, or survivorship.

Based on the sporadic and infrequent change in sound level from baseline and the predicted wildlife startle response (Dufour 1980), the potential for noise disturbance from aircraft operations would have less than significant effects on biological resources.

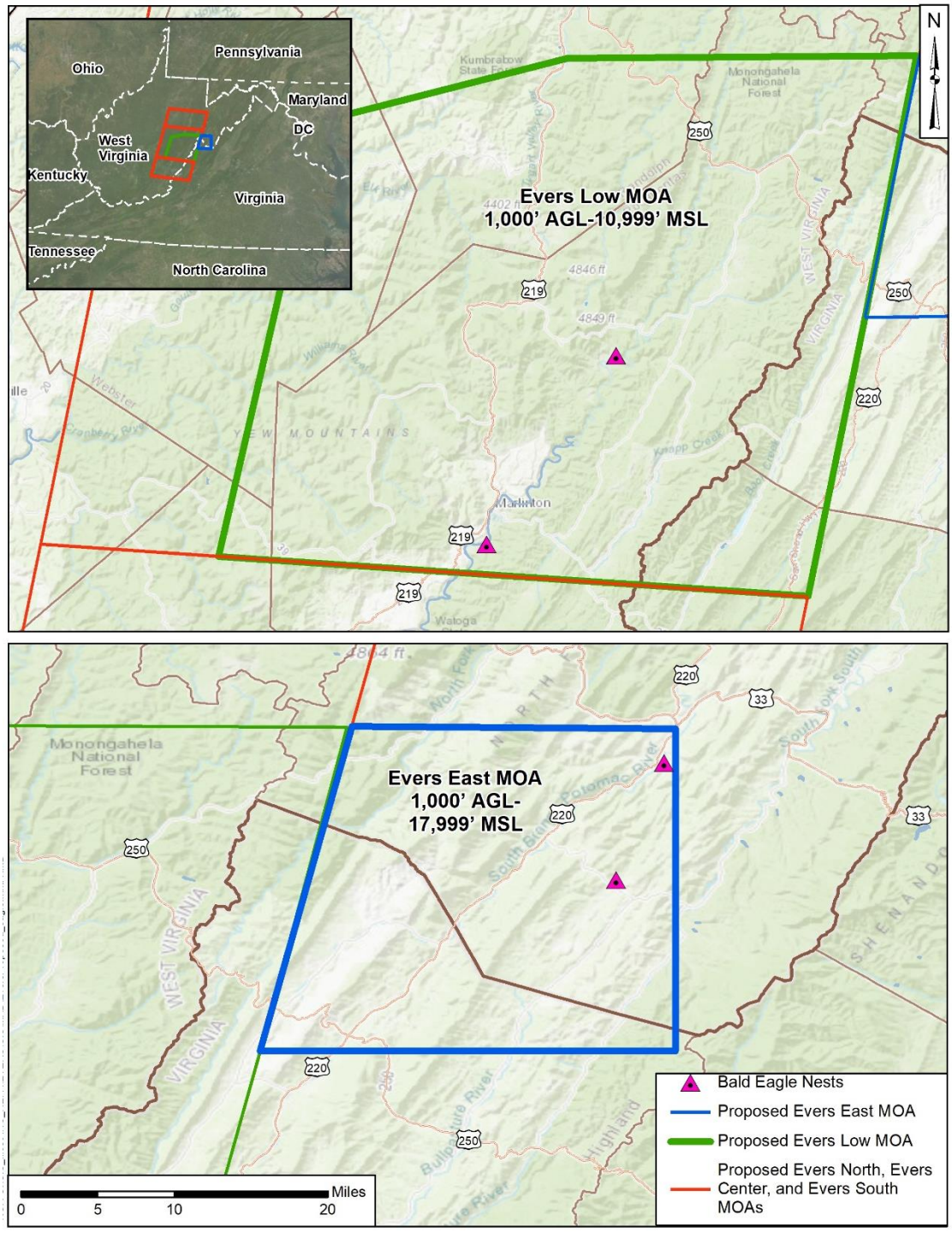


Figure 3-18. Bald Eagle Nest Locations – Evers Low and Evers East MOAs

3.3.4.2 Threatened and Endangered Species

The Proposed Action would have less than significant effects on the federal and state listed species known or expected to occur in the area underlying the Proposed Evers MOA Complex. Due to the fact that no infrastructure changes, no ground-disturbing activities, no supersonic flight activities, no release of chaff and flare, no weapons firing, and no ordnance deployment would occur, no effects to ground-dwelling wildlife (i.e., reptiles, amphibians, fish, and invertebrates) or their associated habitats would result from implementation of the Proposed Action. In addition, water resources (i.e., wetlands, floodplains, surface waters, groundwater, or wild and scenic rivers) were dismissed from detailed analysis for the same reason. All four species of threatened or endangered bats that are found in the region of the Proposed Evers MOA Complex spend the majority of their lives in caves or forests. Some species of bat migrate or hunt at altitudes of 1,100 ft AGL (Peurach 2009), however the known species that do this do not include the threatened and endangered bat species discussed in this EA. Bats are nocturnal animals; therefore, since operations will be nearly always during daylight, contact between bats and aircraft will be unlikely. Therefore, the Proposed Action would have less than significant effect on the bats or their habitats. The migratory path of the red knot, which is federally-listed as threatened and state-listed as endangered, passes over the proposed Evers MOA Complex. However, no preferred nesting or foraging habitat exists beneath the airspace, so it is unlikely that red knots would stop while passing through the region. Potential effects on threatened or endangered species would be limited to noise disturbance and startle response of transient species.

Low-level overflight avoidance of sensitive areas such as wildlife management areas would be emphasized in flight planning to all flying units in the Proposed Evers MOA Complex. Based on the sporadic and infrequent change in sound level form baseline and the predicted wildlife startle response (Dufour 1980), the potential for noise disturbance from aircraft operations would have less than significant effects on threatened or endangered species.

3.3.4.3 Bird-Aircraft Strike Hazard

The Proposed Action would have less than significant effects on bird strike risk. Radar studies have demonstrated that most bird migrations occur under 3,000 ft AGL and for most small birds the preferred altitude is between 500 and 1,000 feet AGL during migration (Lincoln et al. 1998), which is below the floor of 1,000 feet AGL set forth in the Proposed Action. The calculated number of bird strikes for the existing MOA, based on the number of training hours in the low-level airspace and using the USAF-wide BASH rates for individual aircraft types, indicated that the bird strike potential is comparable to USAF-wide rates. Table 3-18 outlines the rate of potential bird strikes based on USAF-wide BASH rates for operations under the Proposed Action. Rates reflect the air operations in the existing Evers MOA and are differentiated based on altitude blocks. In the low-level airspace, there would be an incremental decrease in the rate of bird strikes from 58 to 44

BASH events every 100 years, or a decrease to one event every two years. Overall, bird strike rates would remain small and comparable to USAF-wide rates. These effects would be negligible.

Table 3-18. Bird Strike Rates - Proposed Action

Altitude Block	Low Level (1,000-11,000)	Mid-Level (11,000-18,000)	High-Level (>FL180)	Total
				Training Hours
Existing	99	147	0	246
Proposed	75	179	112	366
Change	-24	33	112	121
				Strikes Per 100,000 Flying Hours
	589.6	5.7	3.0	598
				Total Number of Bird Strikes per Hundred Years
Existing	58	1	0	59
Proposed	44	1	0	46
Change	-14	0	0	-13

Source: USAF 2019b.

In addition to bird strikes, there is potential for bat-aircraft strikes given the nature of some bat species to fly at high altitudes. The number of bat strikes peaks during the spring and fall migration months when the mammals are most active with the majority of collisions in the U.S. occurring at night between the hours of 1900 and 0200. A study that looked at 147 recorded bat strikes concluded that 36 percent occurred above 984 ft AGL and the average altitude of bat-aircraft strike occurrence was approximately 1,132 feet AGL (Peurach 2009). Given that the proposed airspace extends from 1,000 ft AGL to 17,999 ft MSL, most flight operations would take place above the average range of 1,132 ft AGL, thereby reducing the potential for bat/aircraft strikes. There are four threatened or endangered species of bats located in the region of the Evers MOA Complex, but none are recognized as species commonly found involved in bat-aircraft strikes. However, it should be noted that only 49 percent of bats in USAF reported bat-strikes have been identified to the species level (Peurach 2009).

The analysis indicates that the environmental impact as well as safety impact are minimal. By implementing a BASH plan with an AHAS and BAM, pilots in the Evers MOA Complex could effectively plan flights that reduce the potential for bird and wildlife strikes to less than significant levels.

3.3.4.4 Eastern Region Forester Sensitive Species

The Proposed Action would have less than significant effects on the eastern region forester sensitive species known or expected to occur in the area underlying the Proposed Evers MOA Complex. Negligible effects to ground-dwelling wildlife (i.e., small mammals, reptiles, amphibians, fish, and invertebrates), plants, or their associated habitats would result from implementation of the Proposed Action because the calculated mishap potential (Table 3-7) is low

(approximately 1 mishap every 100 years), and no infrastructure changes, no ground-disturbing activities, no release of chaff and flare, no weapons firing, and no ordnance deployment would occur under the Proposed Action. The potential for adverse effects on birds and bats would be negligible because the calculated bird/wildlife strike hazard under the Proposed Action would be low (approximately 1 event every 2 years). These effects would be less than significant, as they would not reduce the distribution or viability of species or habitats of concern.

3.3.5 No Action Alternative

Selecting the No Action Alternative would result in no new or changed effects on biological resources. The modification and expansion of the Evers MOA Complex would not occur. Habitat conditions would remain unchanged when compared to existing conditions.

3.4 CULTURAL RESOURCES

3.4.1 Definition of Resource

Cultural resources are physical evidence of past human activities and may take the form of a site, object, structure, or natural feature such as a landscape that defines communities and links them to their surroundings. The area of potential effects (APE) for cultural resource considerations encompasses the area beneath the existing and proposed MOAs within the Evers MOA Complex.

The NRHP is a listing maintained by the federal government of prehistoric, historic, and cultural buildings, structures, sites, districts, and objects that are considered significant at a national, state, or local level. Listed resources can have significance in the areas of history, archaeology, architecture, engineering, or culture. Cultural resources listed in the NRHP, or determined eligible for listing, have been documented and evaluated according to uniform standards, found in 36 CFR §60.4, and have been found to meet criteria of significance and integrity. Cultural resources that meet the criteria for listing on the NRHP, regardless of age, are called *historic properties*. Resources that have undetermined NRHP eligibility are treated as historic properties until a determination otherwise is made.

Several federal laws, regulations, and EOs address cultural resources and federal responsibilities regarding them. Foremost among these statutory provisions, and most relevant to the current analysis, is the NHPA (54 U.S.C. 300101 et seq.). Section 106 of the NHPA requires federal agencies to consider the effect of their undertakings on historic properties. The Advisory Council on Historic Preservation regulations that implement Section 106 (36 CFR Part 800) describe the process for identifying and evaluating historic properties; assessing effects of federal actions on historic properties; and consulting to avoid, minimize, or mitigate any adverse effects.

As a federal agency, DOD has a trust responsibility to American Indian Tribes (Tribes) to protect tribal cultural resources and to consult with Tribes on a government-to-government basis regarding

those resources. Section 101(d)(6) of the NHPA mandates that federal agencies consult with Tribes and other Native American groups who either historically occupied the project area or may attach religious or cultural significance to historic properties in the region. The NEPA implementing regulations link to the NHPA, as well as to the American Indian Religious Freedom Act (42 U.S.C. 1996), EO 13007 Indian Sacred Sites (61 Federal Register [FR] 26771), EO 13175 Consultation and Coordination with Indian Tribal Governments (65 FR 67249), and the Executive Memorandum on Government-to-Government Relations with Native American Tribal Governments (59 FR 22951). These requirements call on agencies to consult with American Indian tribal leaders and others knowledgeable about cultural resources important to them.

3.4.2 Affected Environment

The cultural and historical setting, national- and state-listed historic sites, and tribally-significant cultural resources within the region of influence are discussed below.

3.4.2.1 Cultural and Historical Setting

The following provides a broad overview of the culture history of the region beneath the existing and proposed Evers MOA Complex (EReferenceDesk 2019a-d). The first known inhabitants in the region were the Paleo-Indians, early hunters and gatherers who arrived sometime before 11,000 B.C. In the Appalachian region, the mountain slopes were bare and tundra-like. The first people lived in small family units or bands. These extended families moved seasonally throughout a broad territory to hunt and forage.

When Europeans arrived in the early 17th century, they found a flourishing population of Native peoples. The Piedmont of Virginia was inhabited by two Siouan confederacies, the Monacan and Mannahoac. Organized tribes such as a Delaware and Shawnee had moved into West Virginia, and the powerful Iroquois Confederacy – an alliance of five Iroquois-speaking nations (Mohawk, Oneida, Onondaga, Cayuga, and Seneca) – began exerting its influence on the region. Once the Europeans arrived, the Native peoples found themselves in competition for land and resources (EReferenceDesk 2019a-d).

West Virginia became the 35th state in the Union on June 20, 1863. After the Civil War ended, the railroads expanded throughout West Virginia, lumber and coal production increased dramatically, and new industries such as chemical, glass, and steel manufacturing moved into the state to use the huge amounts of natural gas produced there. Despite reforms to develop safer working conditions and address other problems experienced by industry laborers, many workers left West Virginia from the 1940s to the 1970s in search of better economic conditions. The 1980s and beyond have seen renewed population growth due to increased retirement to West Virginia, spurred by a wealth of natural resources (EReferenceDesk 2019a-d).

3.4.2.2 National and State Listed Historic Sites

The NRHP was searched to identify historic properties located under the Evers MOA Complex (NPS 2019a and 2019b). There are 126 properties beneath the Evers MOA Complex – 97 in West Virginia and 29 in Virginia (Tables 3-19 and 3-20). Seven of the historic properties within the APE are National Historic Landmarks; two in Virginia and five in West Virginia (NPS 2019c; Tables 3-19 and 3-20). *Preparers Note*: The NGB is currently working with the WV State Historic Preservation Office and the VA Department of Historic Resources to develop a list of cultural resources located beneath the Evers MOA Complex that have been recorded but have not been listed on the NRHP. The list will be provided in the Final EA and can be provided upon request. Because the WV and VA SHPOs have already concurred that there would be no adverse effect to historic properties from the proposed action, the addition of these resources is informational only and not expected to change the results of the analysis in this EA.

Table 3-19. NRHP-Listed Properties in West Virginia Beneath the Evers MOA Complex

Historic Property Name by MOA	Location
Evers North MOA	
Bernard E. Wilmouth House	Bellington, Barbour County
Carrolton Covered Bridge	Carrolton, Barbour County
Upper Glady School	Crawford, Lewis County
Walkersville Covered Bridge	Walkersville, Lewis County
Annamede	Walkersville, Lewis County
Beverly Historic District (boundary increase)	Beverly, Randolph County
Blackman-Bosworth Store	Beverly, Randolph County
Beverly Historic District	Beverly, Randolph County
Butcher Hill Historic District	Beverly, Randolph County
Rich Mountain Battlefield	Beverly, Randolph County
Tygart Valley Homesteads Historic District *(also in Evers Center MOA)*	Dailey, Randolph County
Gov. H. Guy Kump House	Elkins, Randolph County
Elkins Milling Company	Elkins, Randolph County
Wees Historic District	Elkins, Randolph County
Scott Hill	Elkins, Randolph County
First Ward School	Elkins, Randolph County
Riverside School	Elkins, Randolph County
Graceland **	Elkins, Randolph County
Albert and Liberal Arts Halls	Elkins, Randolph County
Pinecrest	Elkins, Randolph County
Randolph County Courthouse and Jail	Elkins, Randolph County
Senator Stephen Benton Elkins House **	Elkins, Randolph County
Taylor-Condry House	Elkins, Randolph County
Davis Memorial Presbyterian Church	Elkins, Randolph County
West Virginia Children's Home	Elkins, Randolph County
Downtown Elkins Historic District	Elkins, Randolph County
Davis and Elkins Historic District **	Elkins, Randolph County
Warfield-Dye Residence	Elkins, Randolph County
Baldwin – Chandlee Supply Company – Valley Supply Company	Elkins, Randolph County
Dr. John C. Irons House	Elkins, Randolph County
Glady Presbyterian Church and Manse	Glady, Randolph County
Day-Vandevander Mill	Harmon, Randolph County
Fred A. Perly House	Jenningston, Randolph County
Middle Mountain Cabins	Wymer, Randolph County

Historic Property Name by MOA	Location
Tucker County Bank Building	Parsons, Tucker County
Tucker County Courthouse and Jail	Parsons, Tucker County
Western Maryland Depot	Parsons, Tucker County
Fidler's Mill	Arlington, Upshur County
Downtown Buckhannon Historic District	Buckhannon, Upshur County
Buckhannon Central Residential Historic District	Buckhannon, Upshur County
Agnes Howard Hall	Buckhannon, Upshur County
Southern Methodist Church Building	Buckhannon, Upshur County
William Post Mansion	Buckhannon, Upshur County
French Creek Presbyterian Church	French Creek, Upshur County
Evers Center MOA	
Downtown Richwood Historic District	Richwood, Nicholas County
Helvetia	Helvetia, Randolph County
Fort Marrow	Huttonsville, Randolph County
E. E. Hutton House	Huttonsville, Randolph County
Tygarts Valley Church	Huttonsville, Randolph County
Cheat Summit Fort	Huttonsville, Randolph County
See-Ward House	Mill Creek, Randolph County
Laurel Run Rockshelter	Coe, Webster County
Camp Caesar	Cowen, Webster County
New Deal Resources in Holly River State Park Historic District	Hacker Valley, Webster County
Craig Run East Fork Rockshelter	Mills Mountain, Webster County
Mollohan Mill	Replete, Webster County
Morton House	Webster Springs, Webster County
Lowther Store	Wheeler, Webster County
Evers Center and Low MOAs	
Camp Alleghany	Bartow, Pocahontas County
Camp Bartow Historic District	Bartow, Pocahontas County
Cass Scenic Railroad	Cass, Pocahontas County
Cass Historic District	Cass, Pocahontas County
Reber Radio Telescope **	Green Bank, Pocahontas County
GW Jeep Site	Green Bank, Pocahontas County
Huntersville Presbyterian Church	Huntersville, Pocahontas County
IOOF Lodge Building	Marlinton, Pocahontas County
Marlinton Opera House	Marlinton, Pocahontas County
Frank and Anna Hunter House	Marlinton, Pocahontas County
Pocahontas Times Print Shop	Marlinton, Pocahontas County
Marlinton Chesapeake and Ohio Railroad Station	Marlinton, Pocahontas County
Pocahontas County Courthouse and Jail	Marlinton, Pocahontas County
Evers East MOA	
McCoy House	Franklin, Pendleton County
Franklin Historic District	Franklin, Pendleton County
McCoy Mill	Franklin, Pendleton County
Evers South MOA	
Blue Bend Forest Camp	Alvon, Greenbrier County
Hopkins Mountain Historic District	Alvon, Greenbrier County
Blue Sulphur Springs Pavilion	Blue Sulphur Springs, Greenbrier County
Homeplace	Frankford, Greenbrier County
Tuckwiller Tavern	Lewisburg, Greenbrier County
Alexander W. Arbuckle, I House	Lewisburg, Greenbrier County
Morlunda	Lewisburg, Greenbrier County
Lewisburg Historic District	Lewisburg, Greenbrier County
Herns Mill Covered Bridge	Lewisburg, Greenbrier County
Deitz Farm	Meadow Bluff, Greenbrier County
Edgefield	Renick, Greenbrier County
Renick Farm	Renick, Greenbrier County
Sam Black Church	Smoot, Greenbrier County
Oakhurst Links	White Sulphur Springs, Greenbrier County
The Greenbrier District **	White Sulphur Springs, Greenbrier County

Historic Property Name by MOA	Location
Richard Beard House	Hillsboro, Pocahontas County
Pearl Buck House	Hillsboro, Pocahontas County
Locust Creek Covered Bridge	Hillsboro, Pocahontas County
New Deal Resources in Watoga State Park Historic District	Marlinton, Pocahontas County
Droop Mountain Battlefield	Marlinton, Pocahontas County
McNeel Mill	Mill Point, Pocahontas County
Pleasant Green Methodist Episcopal Church	Seebert, Pocahontas County
Seebert Lane Colored School	Seebert, Pocahontas County

Note: ** denotes a property also listed as a National Historic Landmark
Source: NPS 2019a; NPS 2019c

Table 3-20. NRHP-Listed Properties in Virginia Beneath the Evers MOA Complex

Historic Property Name by MOA	Location
Evers North MOA	
None	
Evers Center MOA	
None	
Evers Center and Low MOAs	
None	
Evers East MOA	
Monterey High School	Monterey, Highland County
C. P. Jones House and Law Office	Monterey, Highland County
Monterey Hotel	Monterey, Highland County
Evers South MOA	
Humpback Bridge **	Callaghan, Alleghany County
Wood Hall	Callaghan, Alleghany County
Jefferson School	Clifton Forge, Alleghany County
Clifton Forge Historic District	Clifton Forge, Alleghany County
Clifton Forge Commercial Historic District	Clifton Forge, Alleghany County
Clifton Forge Commercial Historic District (boundary increase)	Clifton Forge, Alleghany County
Persinger House	Covington, Alleghany County
Luke Mountain Historic District	Covington, Alleghany County
Rosedale Historic District	Covington, Alleghany County
Covington Historic District	Covington, Alleghany County
Oakland Grove Presbyterian Church	Selma, Alleghany County
Hidden Valley	Bacova, Bath County
Mustoe House	Hot Springs, Bath County
The Yard	Hot Springs, Bath County
Garth Newel	Hot Springs, Bath County
Barton Lodge	Hot Springs, Bath County
Switchback School	Hot Springs, Bath County
Ashwood School	Hot Springs, Bath County
The Homestead **	Hot Springs, Bath County
Homestead Dairy Barns	Warm Springs, Bath County
Oakley Farm	Warm Springs, Bath County
Three Hills	Warm Springs, Bath County
John Wesley Methodist Episcopal Church and Cemetery	Warm Springs, Bath County
Warm Springs Bathhouses	Warm Springs, Bath County
Hidden Valley Rockshelter	Warm Springs, Bath County
Warm Springs Mill	Warm Springs, Bath County

Note: ** denotes a property also listed as a National Historic Landmark
Source: NPS 2019b; NPS 2019c

3.4.2.3 Tribally-Significant Cultural Resources

No Indian reservations are beneath the proposed Evers MOA Complex, and no tribes are known to have tribal lands beneath the MOAs (USGS 2019a and 2019b). The area beneath the proposed Evers MOA Complex was historically occupied at various times by the Shawnee, Iroquois, Delaware, Monacan, Meherrin, Susquehanna, Mannahoac, Moneton, Conoy, Honniasont, Tutelo, and Saponi tribes. Tribal consultation has been initiated by the ANG with the following tribes to determine the presence of tribally-significant cultural resources or concerns the tribes may have regarding the Proposed Action (see Appendix A, *Agency Coordination*).

- Chickahominy Indian Tribe
- Chickahominy Indians – Eastern Division
- Delaware Tribe
- Delaware Nation
- Cherokee Nation
- Monacan Indian Nation
- Nansemond Indian Tribe
- Rappahannock Tribe
- Seneca Nation of Indians
- Seneca-Cayuga Nation
- Tuscarora Nation
  United Keetoowah Band of Cherokee Indians
- Upper Mattaponi Indian Tribe

3.4.3 Significance Criteria

The Proposed Action would have significant effects to cultural resources if: (1) it resulted in impacts to an historic property that meets one or more of the Section 106 Criteria of Adverse Effects (36 CFR §800.5), or (2) a tribe determines that a culturally significant place or property would be adversely affected. The Proposed Action would not include construction, demolition, ground disturbance, renovation, infrastructure upgrades, chaff or flares, weapons firing, ordnance deployment, or supersonic aircraft operations. As such, the Proposed Action would not have the potential to impact archaeological resources.

Section 106 regulations provide specific criteria for identifying effects on historic properties, including:

- Physical destruction of or damage to all or part of a property;
- Physical alteration of a property;
- Removal of a property from its historic location;
- Change in the character of a property's use or of physical features within a property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric, or auditory elements that diminish the integrity of a property's significant historic features;

- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance; or
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of a property's historic significance (36 CFR §800.5[a][2]).

As stated above, noise may adversely affect cultural resources. Implementation of aircraft operations under the Proposed Action would expose cultural resources and their settings to short-term increases in sound levels from low- and mid-altitude aircraft overflights. Low-altitude overflights would be added to the areas underlying the Evers Low and East MOAs. Mid-altitude overflights would be added to the Evers North, Central, South, and East MOAs.

Noise from low-altitude aircraft overflights can cause buildings under their flight path to vibrate, which the occupants experience as shaking of the structure and rattling of the windows. Based on experimental data and models, noise and vibrations from subsonic aircraft overflights do not cause structural damage to buildings. Under the Proposed Action, individual low-altitude and mid-altitude overflights within the SUA complex would not be supersonic and would not generate sonic booms above 140 dB; therefore, there would be no potential for damage to structures.

The analysis of the potential impacts of the Proposed Action to historic property settings from low-altitude and mid-altitude overflights is based on the noise assessment presented in Section 3.2. Changes in the overall noise environment and individual overflights would have no adverse effect on historic properties (see Section 3.2.4).

3.4.4 Environmental Consequences of the Proposed Action

The Proposed Action would introduce additional noise to historic properties located within the APE, but would not compromise those attributes which make the properties eligible for listing in the NRHP. The Proposed Action would not include construction, demolition, ground disturbance, renovation, infrastructure upgrades, chaff or flares, weapons firing, ordnance deployment, or supersonic aircraft operations. As such, the Proposed Action would have no potential to impact archaeological resources.

Section 106 consultation with the West Virginia State Historic Preservation Officer (SHPO) and Virginia SHPO was conducted to determine if historic properties eligible for or listing in the NRHP would be adversely affected by the proposed undertaking. The Virginia and West Virginia SHPO concurred that the Proposed Action would have no adverse effect on historic properties and that no further consultation is necessary. (see Appendix A, *Agency Coordination*).

3.4.4.1 Tribal Concerns

NGB invited 13 Tribal Nations to consult on the Proposed Action through a letter dated 13 June 2019. Tribal coordination was done through certified mail; follow-up phone calls to tribal recipients were conducted at 2 weeks and at 2 months after receipt verification to ask if there are any questions or concerns regarding the Proposed Action. Eight of the 13 Nations responded that they have no concerns with the project as described. The five remaining Nations did not comment or respond (see Appendix A, *Agency Coordination*).

3.4.5 No Action Alternative

The No Action Alternative would have no adverse effect to cultural resources. Cultural resources would remain unchanged when compared to existing conditions.

3.5 LAND USE

3.5.1 Definition of Resource

"Land use" is the term used to describe the human use of land. It represents the economic and cultural activities (e.g., agricultural, residential, industrial, mining, and recreational uses) that are practiced at a given place. Public and private lands frequently represent very different uses. For example, urban development seldom occurs on publicly owned lands (e.g., parks, wilderness areas), while privately owned lands are infrequently protected for wilderness uses.

Land use differs from land cover in that some uses are not always physically obvious (e.g., land used for producing timber but not harvested for many years and forested land designated as wilderness will both appear as forest-covered, but they have different uses). Natural land use categories include state and national forests, state and national parks, wilderness areas, and other similar areas. Human-modified land categories include recreation areas, agricultural areas, research areas, pipelines and powerlines, airports and private airstrips, and other areas developed from natural land cover conditions. Sensitive land use includes those uses intended to preserve natural or cultural resources, contain recreational opportunities and public access, or provide for the management of public lands.

3.5.2 Affected Environment

Almost 90 percent of the land use/land cover under the proposed Evers MOA Complex is forestland (see Figure 3-16). Most of the proposed Evers MOA Complex is in West Virginia. Chapter 8A of the West Virginia Code provides for county planning commissions to develop comprehensive plans for land development and zoning ordinances. The remainder of the proposed Evers MOA Complex is in Virginia. The Code of Virginia mandates that jurisdictions prepare and regularly update a comprehensive plan for the development of their communities. The counties or planning regions under the proposed Evers MOA Complex have comprehensive plans that include

land use planning at the local and state levels[4]. The existing land uses common in the comprehensive plans are primarily forestry and agriculture. Steep terrain and the high proportion of public ownership restrict the land area feasible for development. The common vision outlined in the comprehensive plans is for a sustainable, rural environment and effective growth management. The population density for most of the area under the proposed Evers MOA Complex is less than 25 people per SM (see Figure 3-10).

The Wilderness Act of 1964, Public Law 88-577 (16 U.S.C. 1131-1136) established the National Wilderness Preservation System. The U.S. Congress directed that designated wilderness areas "shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness." Official wilderness has the highest form of protection of any federal wildland. Except as specifically provided for in the Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any designated wilderness area and, except as necessary to meet minimum requirements for the administration of the area for the purpose of the Act (including measures required in emergencies involving health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment, or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such areas[5].

The national forests and wilderness areas beneath the proposed Evers MOA Complex are under federal jurisdiction by the U.S. Forest Service. The shared vision and common goals include efforts to improve and maintain recreation areas, improve watersheds, care for wilderness areas, and achieve sustainable stewardship of national forests[6]. These plans and policies determine the type and extent of land use allowable in specific areas and protect specially designated areas. There are no wind development projects, designated wild and scenic rivers, national historic trails, national recreation areas, Indian reservations, or tribal lands (see Section 3.4.2.3) under the proposed Evers MOA Complex. No appreciably different planned/future land use changes are expected.

3.5.2.1 Evers East and Evers Low MOAs

The human modified land uses under the proposed MOAs include 130 bridges, seven dams, eight state recreation areas, one ski resort, 93 oil/gas wells, and 66,557 acres of pasture/hay agricultural areas. The natural land uses under the proposed MOAS include 1,104,780 acres of national forest,

[4]Alleghany County (2019), Bath County (2014), Greenbrier County (2014), Harrison County (2016), Lewis County (2013), Planning and Development Council (2016), West Virginia University (2019)
[5] https://www.justice.gov/enrd/wilderness-act-1964
[6] USDA Forest Service (2011), USDA Forest Service (2014)

47,337 acres of state parks/forest, and one wilderness area. There are four private airports beneath the proposed Evers Low and Evers East MOAs (see Figure 3-8). Three of the airports are beneath the existing Evers MOA. (refer to Section 3.1, Airspace Management). Figure 3-19 shows land use features under the proposed MOAs.

The 47,815-acre Cranberry Wilderness in the Monongahela National Forest is part of the National Wilderness Preservation System and is the largest in the Eastern U.S. It is under the proposed Evers Low MOA. The area includes the entire drainage of the Middle Fork of the Williams and the North Fork of the Cranberry rivers. Elevations range from 2,400 ft to 4,600 ft above MSL.

3.5.2.2 Evers North, Center, and South MOAs

The human modified land uses under the proposed MOAs include 666 bridges, 24 dams, 35 state recreation areas, one ski resort, 9,383 oil/gas wells, 265 miles of gas pipelines, and 177,740 acres of pasture/hay agricultural areas. The natural land uses under the proposed MOAS include 3,359,452 acres of national forest, 196,866 acres of state parks/forest, and four wilderness areas. There are eight public and private airports beneath the proposed Evers North, Center, and South MOAs (see Figure 3-8). Figures 3-20 and 3-21 show land use features under the proposed MOAs.

The four wilderness areas in the Monongahela National Forest under the proposed MOAs are part of the National Wilderness Preservation System. The 20,698-acre Otter Creek Wilderness is under the proposed Evers North MOA. It lies in a bowl formed by Shavers Mountain and McGowan Mountain. Elevations range from 1,800 ft to 3,900 ft above MSL. The 11,839-acre Laurel Fork North Wilderness is under the proposed Evers North and Center MOAs. It is characterized by a narrow valley floor with regularly dissected slopes and long narrow ridges. Elevations range from 2,900 ft to 3,700 ft above MSL. The 6,030-acre Spice Run Wilderness Area is under the proposed Evers South MOA. Elevations range from 2,000 ft to 2,800 ft above MSL. The 5,144-acre Big Draft Wilderness is also under the proposed Evers South MOA. It is characterized by long ridges with narrow summits and mountain slopes. Elevations range from 1,800 ft to 3,100 ft above MSL.

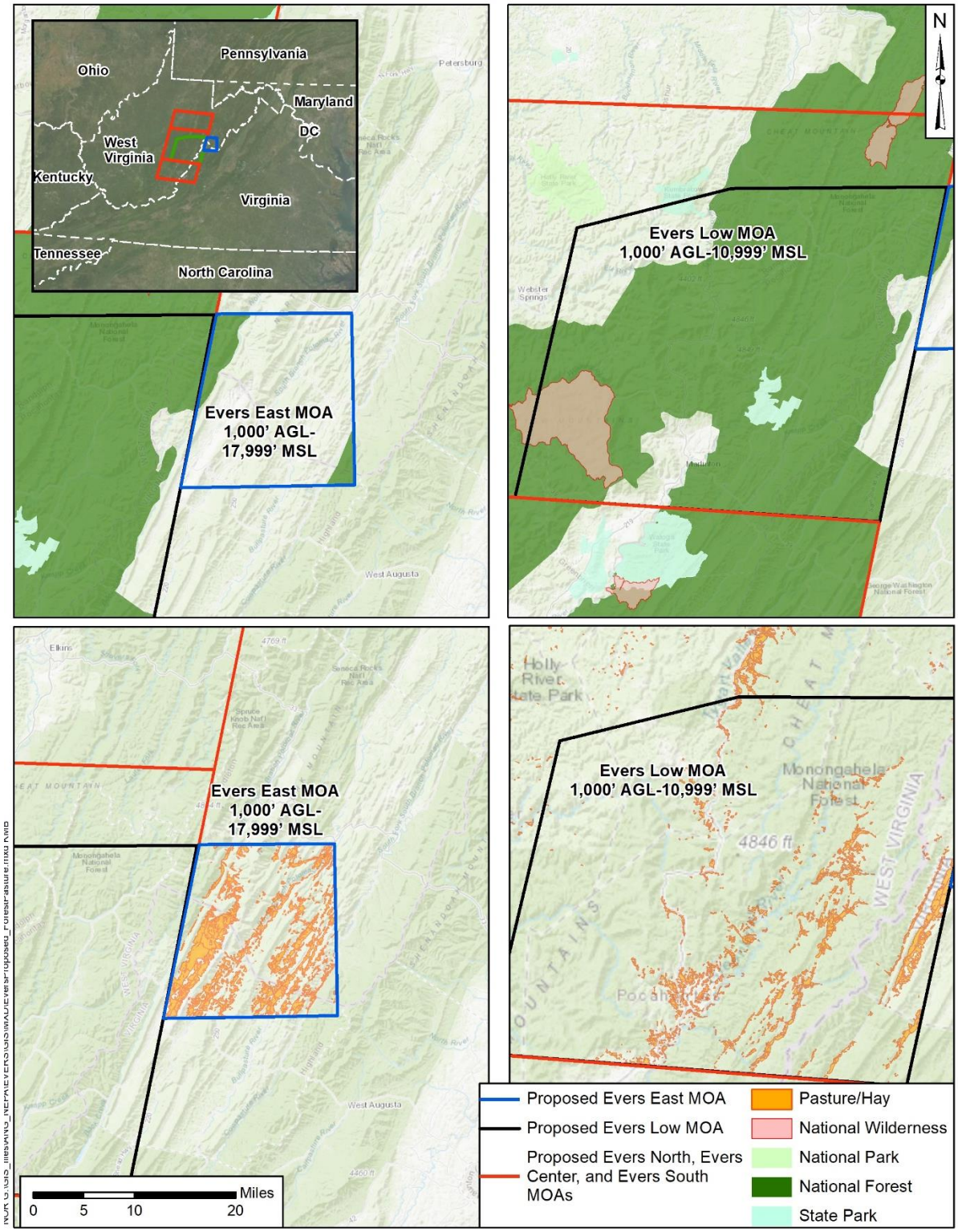


Figure 3-19. Land Use Features – Evers Low and Evers East MOAs

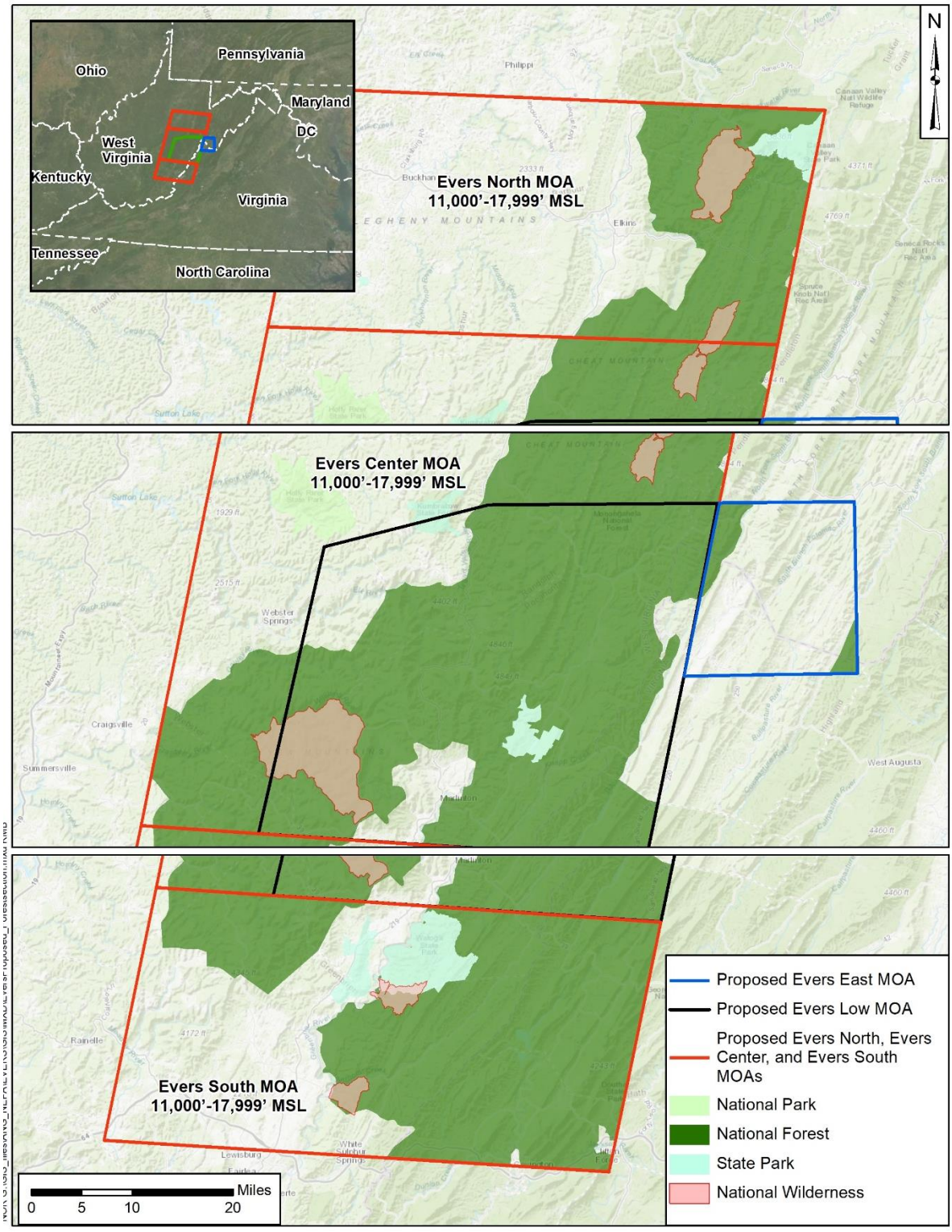


Figure 3-20. Forest Land Use Features – Evers North, Center, and South MOAs

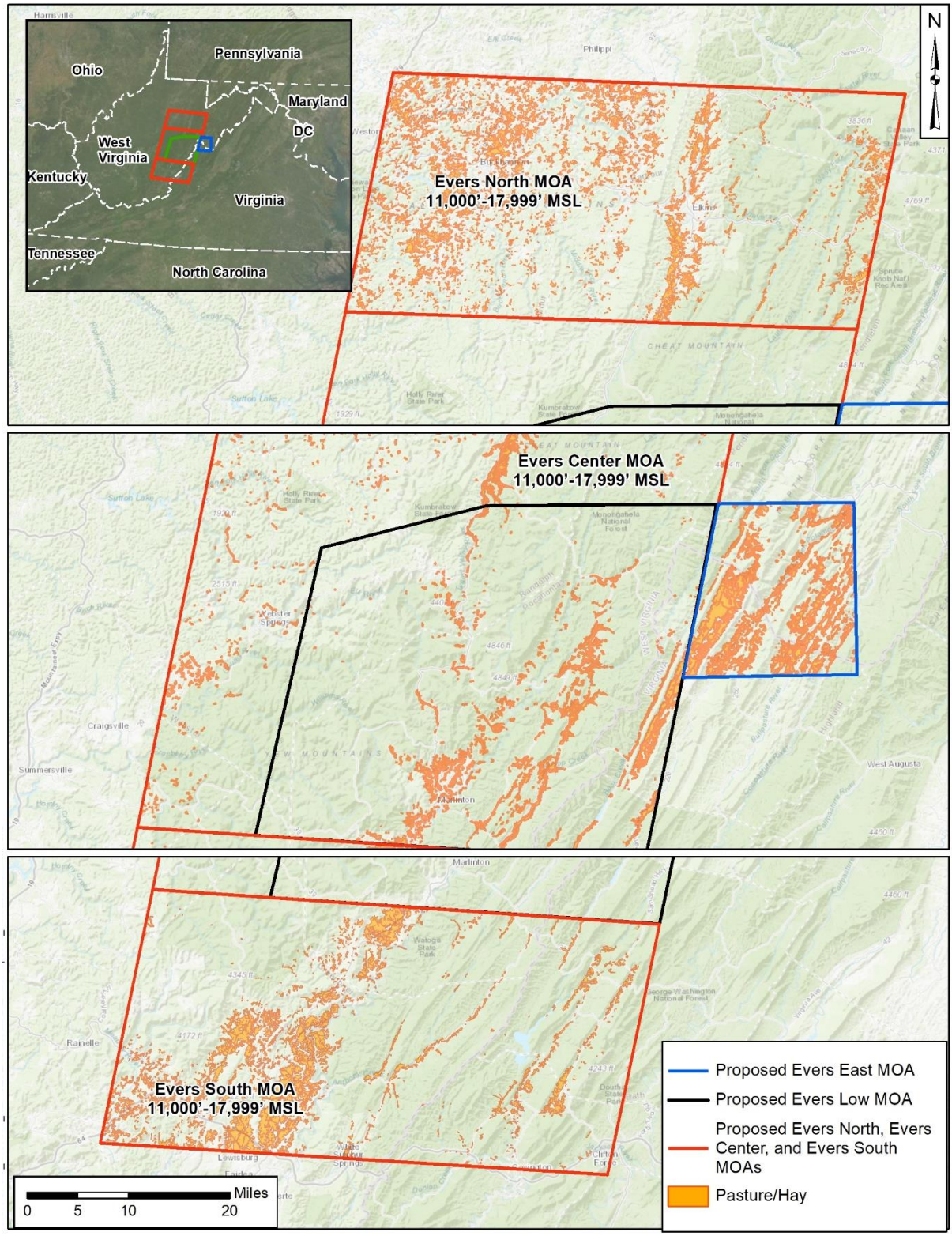


Figure 3-21. Pasture Land Use Features – Evers North, Center, and South MOAs

3.5.3 Significance Criteria

The Proposed Action would have significant effects on land use if the Proposed Action would: 1) be inconsistent with applicable land use plans or policies; 2) preclude an existing land use; 3) preclude continued use of an area; or 4) be incompatible with adjacent or vicinity land use to the extent that public health or safety is endangered. The analysis of environmental effects includes assessment of the regulatory setting for existing land uses and spatial analysis of land uses.

In accordance with FAA Order 1050.1, a land use impact would occur if a noise level over a land use was greater than the compatible noise levels associated with a range of land use activities presented in FAA Order 1050.1. For FAA purposes, a significant impact would occur if noise levels increased by 1.5 dB or more at or above 65 DNL.

3.5.4 Environmental Consequences of the Proposed Action

The Proposed Action would have less than significant adverse effects to land use. Effects would be due to the introduction of low- to mid-altitude military overflights beneath the proposed Evers Low MOA. There would be no short- or long-term changes in land use due to the Proposed Action. There would be no changes in personnel, no construction, and no changes in ground-based operations or training due to the Proposed Action. The Proposed Action would not 1) be inconsistent with applicable land use plans or policies; 2) preclude an existing land use; 3) preclude continued use of an area; or 4) be incompatible with adjacent or vicinity land use to the extent that public health or safety is endangered. All land uses would remain unchanged when compared to existing conditions.

Changes in the natural or constructed environment that alter, detract, or eliminate use or enjoyment of a place affect land use. Since the Proposed Action would not involve ground disturbance, the potential effects on land use would be associated with noise from aircraft operations in the proposed Evers MOA Complex. Aircraft operating within the ATCAAs would be comparable to high altitude civilian aircraft, and would not generate sound levels loud enough to affect land use or land users; therefore, they were no carried forward for detailed evaluation.

In accordance with 14 CFR § 91.119, *Minimum Safe Altitudes*, aircraft would continue to follow low-level guidance and remain 1,000 ft above the highest obstacle and 2,000 ft laterally when over congested or populated areas, as well as 500 ft above all known or observed antennas and obstacles. In addition, avoidance of noise-sensitive areas would be emphasized to all flying units using the Evers MOA Complex (see Section 5.0, Management Actions and Special Procedures).

The FAA considers 65 dBA DNL as the threshold of significance for assessing noise impacts (refer to Section 3.2, Noise). Under the Proposed Action, no areas beneath the Evers MOA Complex would experience noise levels greater than or equal to the 65 dBA DNL threshold. In addition, noise levels would remain under 55 dBA DNL which would be considered loud in outdoor areas

and other places in which quiet is a basis for use. Noise effects are described in greater detail in Section 3.2, Noise.

3.5.4.1 Evers East and Evers Low MOAs

The proposed MOAs extend above land uses considered sensitive. Sensitive areas include historic properties (refer to Section 3.4.2.2), parks and recreation areas, state and national forests, wilderness, and research areas. Aircraft operations and the periodic occurrence of aircraft-generated noise above sensitive land use settings could be perceived as intrusive. The Proposed Action would not affect the utilization of any part of the existing physical landscape and any land use effects associated with aircraft noise would be short-term.

The Proposed Action would decrease noise levels by 4.6 dBA DNL beneath the existing Evers MOA. Aircraft operations would be distributed throughout the proposed MOAs. The maximum estimated DNL under the Evers East and Evers low MOAs would be below the FAA threshold of significance (65 dBA DNL); therefore, effects on land use would be less than significant.

Brief and intermittent noise from individual overflights within the proposed low MOAs could be in excess of 75 dBA L_{max} at any given point on the ground (refer to Section 3.2). Flight operations could include aircraft diving to 1,000 ft AGL for a small amount of time and then returning to higher altitudes (refer to Section 3.2, Noise). Aircraft operations would normally not occur repeatedly at any one location. While individual flyover events would be loud at times, due to the infrequency of these events in any one location and the short duration of exposure, the land use under the proposed MOAs would not be subject to increases in overall noise level that would result in a significant effect on the land use or land users.

The noise level increase from the Proposed Action above the Cranberry Wilderness would be 5.2 dBA DNL above the estimated background noise level of 42 dBA DNL (see Table 3-11). Avoidance of noise-sensitive areas such as the Cranberry Wilderness to the maximum extent practicable would be emphasized by the 113 WG to all flying units during the flight planning stage so as not to appreciably increase the noise environment in the wilderness area. See Appendix A for IICEP coordination and response from the U.S. Forest Service.

The noise level increase from the Proposed Action above the human modified land uses would be 5.2 dBA DNL above the estimated background rural/remote noise level of 42 dBA DNL. Noise from aircraft operations under the Proposed Action would not exceed 65 dBA DNL and, in accordance with FAA Order 1050.1, would be compatible with the human modified land uses.

Aircraft using the airports under the proposed Evers East and Evers Low MOAs would arrive and depart essentially unimpeded; however, some revectoring may be required during periods when the Evers MOAs are active (refer to Section 3.1, Airspace Management). These effects would be less than significant on the existing airport land use.

3.5.4.2 Evers North, Center, and South MOAs

The proposed MOAs extend above land uses considered sensitive. Sensitive areas include historic properties (refer to Section 3.4.2.2), parks and recreation areas, state and national forests, wilderness, and research areas. Aircraft operations and the periodic occurrence of aircraft-generated noise above sensitive land use settings could be perceived as intrusive. Aircraft operations would be more than 5,000 ft AGL. The existing number of ft above MSL elevation under the proposed North, Center, and South MOAs would result in flight operations being at least 5,000 ft AGL for a floor altitude of 11,000 ft above MSL. The Proposed Action would not affect the utilization of any part of the existing physical landscape and any land use effects associated with aircraft noise would be short-term.

The maximum estimated DNL under the Evers East and Evers low MOAs would be below the FAA threshold of significance (65 dBA DNL); therefore, effects on land use would be less than significant. (see Section 3.2.4). Brief and intermittent noise from individual overflights within the proposed MOAs would range from approximately 50 to 80 dBA (see Figure 3-12 and Table 3-13). Aircraft operations would normally not occur repeatedly at any one location. While individual flyover events would be loud at times, due to the infrequency of these events in any one location and the short duration of exposure, the land use under the proposed MOAs would not be subject to increases in overall noise level that would result in a significant effect on the land use or land users.

The noise level increase from the Proposed Action above the four wilderness areas under the proposed MOAs would be 0.9 to 1.0 dBA DNL above the estimated background noise level of 42 dBA DNL (see Table 3-11). Although, overflights may be visible to the wilderness user at times, the Proposed Action would not appreciable increase the noise environment in the wilderness areas.

The noise level increase from the Proposed Action above the human modified land uses would be slightly greater than the estimated background rural/remote noise level of 42 dBA DNL. Noise from aircraft operations under the Proposed Action would not exceed 65 dBA DNL and, in accordance with FAA Order 1050.1, would be compatible with the human modified land uses.

Aircraft using the airports under the proposed Evers East and Evers Low MOAs would arrive and depart essentially unimpeded; however, some revectoring may be required during periods when the Evers MOAs are active (refer to Section 3.1, Airspace Management). These effects would be less than significant on the existing airport land use.

3.5.5 No Action Alternative

Selecting the No Action Alternative would result in no additional effects on land use or land users. The modification and expansion of the Evers MOA Complex would not occur. There would be no

changes in the natural or built environment that could alter, detract, or eliminate use or enjoyment of a place. Land use conditions would remain unchanged when compared to existing conditions.

4.0 CUMULATIVE EFFECTS

Cumulative impacts on environmental resources result from the Proposed Action when combined with other past, present, and reasonably foreseeable projects in an affected area. Cumulative impacts can result from minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, or local) or persons. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the near future is required.

4.1 APPROACH TO CUMULATIVE EFFECTS ANALYSIS

In accordance with CEQ guidelines for considering cumulative effects under NEPA (CEQ 1997b), this cumulative impact analysis includes three major considerations, including: (1) determine the scope of the cumulative analysis, including relevant resources, geographic extent, and timeframe; (2) conduct the cumulative effects analysis; and (3) determine the cumulative impacts to relevant resources.

4.1.1 Scope of Cumulative Effects Analysis

CEQ guidelines require that potential cumulative impacts be considered over a specified period (i.e., from past through future). The appropriate time for considering past, present, and reasonably foreseeable future projects can be the design life of a project, or future timeframes used in local master plans and other available predictive data. Determining the timeframe for the cumulative impacts analysis requires estimating the length of time the impacts of a Proposed Action would last and considering the specific resource in terms of its history of degradation. The Proposed Action includes the future military training exercises within the Evers MOA Complex. While training and testing requirements change over time – in response to world events and several other factors – the general types of activities addressed in this EA would be conducted as often as annually, and the potential impacts associated with those operations would occur as often as annually. Therefore, the cumulative impacts analysis presented herein is not bound by a specific future timeframe.

Per CEQ guidelines, to assess the influence of a given action, a cumulative impact analysis should be conducted using existing, readily available data and the scope of the cumulative impact analysis should be defined, in part, by data availability. Consequently, only past projects or reasonably foreseeable future projects with the potential to contribute to cumulative impacts of the Proposed Action or its alternatives have been evaluated in this section. While the cumulative impacts analysis is not limited by a specific timeframe, it should be recognized that available information, uncertainties, and other practical constraints limit the ability to analyze cumulative impacts for the indefinite future. Consequently, future actions that are speculative are not considered in this EA.

Cumulative effects may occur when there is a relationship between an action and other actions expected to occur in a similar location or during a similar period. Actions overlapping with or in close proximity to the Proposed Action could reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide temporally would tend to offer a greater potential for cumulative effects.

4.1.2 Past, Present, and Reasonably Foreseeable Actions

No past, present, and reasonably foreseeable future action related to airspace use and management have been identified.

4.1.3 Cumulative Effects Analysis and Potential Effects

For the purposes of this EA, no projects with the potential to affect or interact with the proposed airspace complex were identified. Additionally, no other projects that typically affect or interact with airspace proposals were identified. For example, review of recently completed, in-progress, and planned projects did not identify any proposed wind towers, proposed federally designated critical habitat, or proposed protected areas (e.g., recreation areas, natural areas, etc.). Consequently, as no other projects have been identified as either in close proximity to the Evers MOA Complex or as having a cumulative impact on shared resources, implementation of the Proposed Action would not contribute to any significant adverse cumulative impacts. A review of cumulative effects under each resource carried forward for detailed analysis in the EA is provided below.

4.1.3.1 Airspace Management

The Proposed Action would have less than significant adverse effects on airspace management. Proposed airspace operations would pose constraints to existing and future commercial and civilian air traffic when activated. Cumulative effects on airspace management in the proposed Evers MOA Complex would be less than significant when compared to existing conditions.

4.1.3.2 Noise

The Proposed Action would have less than significant adverse effects on noise. Effects would be due to noise from the introduction of low- to mid-altitude military overflights in the proposed Evers Low MOA. The Proposed Action would not increase noise levels by more than 1.5 dBA DNL in a noise sensitive area that is exposed to noise above 65 dBA DNL or generate individual acoustic events loud enough to damage hearing or structures. Cumulative effects on the noise environment beneath the proposed Evers MOA Complex would be less than significant when compared to existing conditions.

4.1.3.3 Biological Resources

The Proposed Action would have less than significant adverse effects on biological resources. Effects would be due to the introduction of low- to mid-altitude military overflights in the proposed Evers Low MOA. The Proposed Action would not reduce the distribution or viability of species or of critical habitats. Effects on wildlife and their habitats beneath the proposed Evers MOA Complex would be negligible, and not measurably different when compared to existing conditions. Cumulative effects on biological resources beneath the proposed Evers MOA Complex would be less than significant when compared to existing conditions.

4.1.3.4 Cultural Resources

While effects resulting from the introduction of noise into historic property settings are expected from the Proposed Action, those effects would not significantly affect the features of those properties that make them eligible for listing in the NRHP; therefore, the proposed action would have no adverse effects to historic properties or culturally significant places.

4.1.3.5 Land Use

The Proposed Action would have less than significant adverse effects on land use or land users. Effects would be due to the introduction of low- to mid-altitude military overflights in the proposed Evers Low MOA. Noise from aircraft operations under the Proposed Action would not exceed 65 dBA DNL and would be consistent with all land uses. This includes being compatible with wilderness area, residential area, church, school, and recreational area guidelines. Cumulative effects on land use beneath the proposed Evers MOA Complex would be less than significant when compared to existing conditions.

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5.0 MANAGEMENT ACTIONS AND SPECIAL PROCEDURES

This section summarizes special operating procedures associated with this EA. Evaluations contained in this EA have determined that no significant environmental effects would result from implementation of the Proposed Action; therefore, no mitigation would be required. This determination is based on thorough review and analysis of existing resource information, coordination with installation personnel, and relevant agency coordination.

The following management actions and special procedures are currently or would be implemented:

- The Evers MOAs would only be activated on an as-needed basis – allowing for more responsible stewardship of the regional airspace, allowing use by others when not needed for training exercises, and helping to minimize potential conflicts with other users.

- The proposed airspace (ATCAA, North, Center, South) would be activated individually or all together depending on mission. Aircrews will not use airspace that has not been previously scheduled.

- The schedule for the Evers MOA Complex would be maintained on the FAA Special Use Airspace v4.0 application at: https://sua.faa.gov/sua/siteFrame.app.

- Flying schedules would normally be transmitted to ZDC the day prior to activation, but no later than 4 hours prior, at which time a NOTAM is generated.

- Standard preflight mission planning requirements would include monitoring the Avian Hazard Advisory System and modifying or cancelling sorties in areas or periods with "moderate" to "severe" Bird Aircraft Strike Hazard risks.

- Avoidance of noise-sensitive areas would be emphasized to all flying units where overflights at low altitudes should be avoided to the maximum extent practicable.

- Military aircraft training in the proposed Evers MOA Complex would maintain contact with the controlling agency to ensure proper separation with all non-participating aircraft.

- The proposed MOAs would only be activated and used during VMC, whereas VFR flight rules would always be permitted. (i.e., Pilots would always have sufficient visibility to maintain visual separation from terrain and other aircraft during approach and departure from the airports.)

- Military safety officers would continue to utilize the Mid-Air Collision and Avoidance educational and outreach program to conduct public awareness and outreach.

- Upon request from the FAA or airports affected, written procedures would be established (per FAA JO 7400.2) to ensure proper IFR separation.
- The 113 WG will be responsible for scheduling and managing airspace usage. The 113 WG will provide GBO an airspace schedule the week prior and notify of any changes or additions to the maximum extent.
- The 113 WG would coordinate with U.S. National Forest, Regions 8 and 9, to avoid potential conflicts with wildland fire and prescribed fire operations within the Evers MOA Complex.

In addition, the USAF and FAA outline other ongoing management requirements and special procedures for SUAs. The Proposed Action would proceed in full compliance with current USAF and FAA requirements, including:

- FAA Order JO 7610.4, Special Operations;
- FAA Order JO 7110.65, Air Traffic Control;
- FAA Order JO 7400.2, Procedures for Handling Airspace Matters;
- FAA Order 1050.1, Environmental Impacts: Policies and Procedure;
- AFI 13-201, Airspace Management;
- AFI 32-7063, Air Installation Compatible Use Zones Program;
- AFI 11-214, Air Operations Rules and Procedures; and
- AFI 11-200, Aircrew Training, Standardization/Evaluation, and General Operations Structure;

This listing is not all-inclusive; the ANG and users of the Evers MOA Complex would continue to comply with all applicable regulations and guidance.

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Appendix A Public and Agency Coordination

U.S. Department
of Transportation
**Federal Aviation
Administration**

ATO Mission Support Services
Airspace Services
800 Independence Avenue SW
Washington DC 20591

Scott P. Chambers, P.E., Colonel, USAF
National Guard Bureau
3501 Fetchett Avenue
Joint Base Andrews, Maryland 20762-5157

October 26, 2018

Dear Colonel Chambers,

Thank you for your letter of October 25, 2018 requesting that the Federal Aviation Administration (FAA) participate as a cooperating agency in the National Guard Bureau's (NGB) preparation of an Environmental Assessment (EA) for the Modification and/or Addition of Airspace Utilization of the Evers Military Operations Area (MOA), West Virginia. Per NGB's letter, this project will evaluate the following in the EA:

Establishment of Evers North MOA;
Establishment of Evers Central MOA;
Establishment of Evers South MOA;
Establishment of Evers Low MOA;
Establishment of Diesel North ATCAA;
Establishment of Diesel Central ATCAA;
Establishment of Diesel South ATCAA; and
Elimination of the Existing Evers MOA

The FAA appreciates the NGB's recognition of our role in the evaluation of Special Use Airspace (SUA) and analysis of potential impacts to airspace associated with your project as required by the National Environmental Policy Act (NEPA) and its implementing regulations at 40 C.F.R. Part 1500. Since this proposal involves the use of SUA, the FAA accepts the NGB's request to act as a cooperating agency in accordance with the guidelines set forth in the Memorandum of Understanding (MOU) between the FAA and the Department of Defense (DoD) Concerning SUA Environmental Actions, dated October 4, 2005, and in accordance with the NEPA regulations at 40 C.F.R. Section 1501.6 regarding cooperating agencies, and with FAA Order 7400.2L, Chapter 32, Appendix 8 – *FAA Special Use Airspace Environmental Processing Procedures* which outlines the process by which FAA works with DoD as a cooperating agency on projects involving SUA.

FAA's participation in the development of the EA for this proposed action resides under the jurisdiction of FAA's Eastern Service Center, Operations Support Group, at 1701 Columbia Avenue, College Park, Georgia 30337. Debra Hogan is the Environmental Team Manager for Eastern Service Center who will assign an environmental specialist to coordinate NEPA

document development and reviews. The Eastern Service Center's environmental specialist will be the focal point for matters related to the review of the NGB's NEPA documentation for this project and any related airspace issues that will be tracked and coordinated by FAA Headquarters Environmental Policy Group (AJV-114).

While Appendix 8 of FAA Order 7400.2L indicates that the airspace review and environmental impacts review should be conducted in tandem as much as possible, they are still separate processes. Approval of either the aeronautical portion or the environmental impact analysis portion of the NEPA document does not automatically indicate approval of the entire proposal. Enclosed are Appendices 7 and 8 from FAA Order 7400.2L for additional details.

A copy of your request for FAA's cooperating agency status and this reply are being forwarded to Debra Hogan of the Service Center's Operations Support Group. Ms. Hogan can be contacted at 404-305-5618 or Debra.L.Hogan@faa.gov for further review of the NEPA document(s).

For questions regarding NEPA document processing and coordination with the Service Center, please contact either me in the Airspace Policy Group (AJV-11) at 202-267-1209, or Paula Miller 202-267-7378 in AJV-114 (Environmental Policy Team).

Sincerely,

Rodger A. Dean
Manager, Airspace Policy Group
Air Traffic Organization
Federal Aviation Administration

Cc: Kevin Marek, NGB/A4AM
Debra Hogan, Operations Support Group Environmental Team Manager, Eastern Service Center
Paula Miller, AJV-114, FAA HQ/ATO Environmental Policy Team
Lisa Favors, Environmental Specialist, FAA/AJV-114, Eastern Service Center
Sean Hook, Maj, USAF, Exec. Dir., USAF/FAA HQ/AJV-11
Paul Gallant, AJV-113, FAA HQ/ATO Regulatory Policy Team

Enclosures
Chapter 32, Appendices 7 and 8 from FAA Order 7400.2L

Appendix 7. FAA/DOD Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING BETWEEN

THE FEDERAL AVIATION ADMINISTRATION AND

THE DEPARTMENT OF DEFENSE

FOR

ENVIRONMENTAL REVIEW OF SPECIAL USE AIRSPACE ACTIONS

I. Definitions.[1]

In addition to definitions in the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) (40 CFR Part 1508), the following definitions also apply to this Memorandum of Understanding (MOU):

"DoD" means the Department of Defense or one or more components thereof, depending on the context.

"SUA" means "special use airspace," as defined in FAA Order JO 7400.2.

"DoD SUA Action" means a DoD activity for which the FAA determines an FAA SUA Action is required or otherwise warranted.

"Environmental Review Process" means all activities that are necessary for compliance with the following and must be completed before DoD and FAA SUA Actions can be implemented: the National Environmental Policy Act (NEPA); the CEQ Regulations; DoD and FAA NEPA-implementing procedures; and other federal environmental laws, regulations, executive orders, and administrative directives.

"Proponent" means: (1) DoD for FAA SUA Actions for which the FAA requires submission of a proposal by DoD; and (2) the FAA for other FAA SUA Actions.

"FAA SUA Action" means the FAA's establishment, designation, or modification of SUA for which a component of DoD is the "using agency," as defined in FAA Order JO 7400.2.

II. Purpose and Scope.

The purpose of this MOU is to describe guidelines for efficiently conducting the Environmental Review Process for DoD and FAA SUA Actions by avoiding unnecessary duplication of effort and reducing delay through effective coordination and cooperation between the agencies.

[1] Terms defined in this section are capitalized throughout the document.

This MOU applies "lead agency" (40 CFR §1501.5) and "cooperating agency" (40 CFR §1501.6) concepts and requirements to Categorical Exclusions (CATEXs), Environmental Assessments (EA), Environmental Impact Statements (EIS), and other related or supporting documents for DoD and FAA SUA Actions.

III. Designation of Lead and Cooperating Agencies (40 CFR §1508.16 and §1508.5).

A. Introduction. DoD and FAA SUA Actions can be subject to different levels and scope of environmental impact analyses pursuant to NEPA, as implemented by the CEQ regulations and by the DoD's and the FAA's agency-specific NEPA-implementing procedures. The CEQ regulations encourage designation of a lead agency where related actions by several Federal agencies are involved.

Either the DoD or the FAA may be the lead or cooperating agency for a NEPA review addressing both DoD and FAA SUA Actions. The lead agency, in such instances, is responsible for consultation with other agencies, for early and continuing coordination of appropriate environmental evaluations and analyses, and, in coordination with the cooperating agency, for making and documenting determinations under other applicable environmental laws and regulations (e.g., the Endangered Species Act and the National Historic Preservation Act) and incorporating such documentation into the appropriate NEPA document. The lead agency will invite other federal agencies having jurisdiction by law or special expertise with respect to any environmental issue that should be addressed in the NEPA process to become a cooperating agency (40 CFR §§1501.6, 1508.5).

Both the FAA and the DoD acknowledge the purposes of NEPA (40 CFR §1500.1), and the need to both eliminate unnecessary duplication and reduce delay. Accordingly, the FAA and the DoD will integrate NEPA considerations and requirements of both agencies into the SUA project planning process as early as possible in their respective project planning schedules. The agencies will also strive cooperatively to coordinate development of environmental documents that meet the standards for adequacy in accordance with both agencies' NEPA implementing procedures, thereby expediting completion of the Environmental Review Process.

B. Designation of lead agency. The Proponent will serve as the lead agency (40 CFR §1501.5).

C. Designation of cooperating agency. The DoD and the FAA will ensure designation of the cooperating agency early in the NEPA process (40 CFR §1501.6). Upon request of the lead agency, the DoD or the FAA will serve as a cooperating agency.

Written requests by the FAA and the DoD will be directed to:

Federal Aviation Administration	
Airspace Regulations and Policy Group (AJV-11)	OSG Manager of the applicable FAA Service Center
Air Force	
Deputy Assistant Secretary of the Air Force for Installations (SAF/IEI) 1665 Air Force Pentagon	cc: AF/A3TI - Airspace Policy Rm 5D756 1480 AF Pentagon

Rm 4B941 Washington, DC 20330-1665	Washington, DC 20330-1480 (703) 692-7752 HQ AF/A4CP Installation Strategy and Plans Division Rm 4D950 1260 Air Force Pentagon Washington DC, 20330-1260 (703) 614-0237
Navy	
Director Chief of Naval Operations (N45) 2000 Navy Pentagon (Rm 2E259) Washington, DC 20350-2000	cc: Chief of Naval Operations will direct to appropriate code
Marine Corps	
MCICOM (Attn: NEPA) Headquarters Marine Corps 3000 Marine Corps Pentagon Room 2D153A Washington, DC 20350-3000	
Army	
Asst. Chief of Staff for Installation Management Installation Services, Environmental (DAIM-ISE) 600 Army Pentagon (5A120-1) Washington, DC 20310-0600	cc: Deputy Assistant Secretary of Army, Environmental Safety and Environmental Health (DASA(ESOH)) Headquarters, U.S. Army Aeronautical Services Agency (Attn: Airspace Branch) 9325 Gunston Road, Suite N319, Fort Belvoir, Virginia 22060
Major Range and Test Facility Base (MRTFB)*	
Director, Test Resource Management Center (TRMC) 4800 Mark Center Dr., Suite 07J22 Alexandria, VA 22350	

*The MRTFB is managed by the TRMC and includes Army, Navy, and Air Force test ranges and associated airspace as designated by annual issuance. The TRMC will coordinate with the lead or cooperating agency as necessary

IV. Documentation.

A. General. To eliminate unnecessary duplication, reduce paperwork, and reduce delay, the FAA and the DoD will cooperatively develop necessary environmental documentation. The agencies will share and may use, as allowed by their respective regulations/directives, background data and impact analysis prepared by either agency in support of a DoD or FAA SUA Action. Documentation will be developed and processed in accordance with applicable FAA Orders, DoD directives and regulations, and established cooperating agency relationships (40 C.F.R. §1506.1).

The lead agency will provide, within scope (40 C.F.R. §1508.25), project-specific related data supporting the proposed action, alternatives, and impact analyses to the cooperating agency to facilitate the development of a legally defensible NEPA document and support appropriate determinations.

The lead and/or cooperating agency will independently evaluate any information or analysis before using it to support a NEPA review. The intent of the lead and cooperating agency relationship is to ensure mutually adequate documentation that complies with both the lead and cooperating agencies' NEPA-implementing procedures. Deficiencies in information, analysis, or other issues covered within the scope of the documentation will be addressed and corrected during cooperating agency concurrent review(s).

B. Categorical Exclusions.

The DoD and the FAA will address the availability of CATEXs early in the development of DoD and FAA SUA Actions. CATEXs are not interchangeable between the agencies. If the Proponent decides to rely on a CATEX for its action and the cooperating agency cannot rely on a CATEX for its action, the Proponent will provide information and analysis the cooperating agency identifies as necessary for the cooperating agency's NEPA review. To the extent consistent with the cooperating agency's NEPA-implementing procedures, the cooperating agency may request that the Proponent prepare an EA or fund the preparation of an EA or EIS.

V. General Guidance.

A. Scheduling. To help avoid unnecessary delay in the Environmental Review Process, the DoD and the FAA will establish a mutually agreed-upon schedule that reflects appropriate time limits to ensure that required actions are taken on a timely basis, consistent with the cooperating agency designation (ref. III.C.). The schedule will accommodate both agencies' requirements (e.g., DoD mission requirements, FAA requirements for processing SUA proposals, both agencies' NEPA-implementing procedures). Each agency will promptly notify the other of any difficulty with meeting scheduled deadlines or any need to revise the schedule.

B. Administrative Records. The FAA and the DoD, as either lead or cooperating agency, agree to develop and maintain an administrative record of each SUA project in accordance with their agency's respective administrative record and document retention rules and requirements. In the event either agency's action is timely challenged, the other agency will make its administrative record available to the agency whose action has been challenged.

C. Resolution of disagreements. If the FAA and the DoD fail to reach agreement at the normal working level on any issue relating to environmental processing of proposed SUA Actions, the matter will be referred, in ascending order, as outlined in the table below. At any time, the FAA's Office of the Chief Counsel and the Office of the General Counsel of the Service Department involved shall be consulted for assistance with legal issues.

Equivalent Levels of Responsibility for Resolution of Disagreements	
FAA Administrator	DoD Policy Board on Federal Aviation (PBFA) Chairman
FAA Chief Operating Officer, Air Traffic Organization	DoD PBFA Executive Director Principal Member
FAA VP, Mission Support Services	DoD PBFA Deputy Executive Director
FAA Director, Airspace Services	DoD PBFA Airspace and Procedures Subgroup Chair

D. Funding. Agency budget constraints may delay processing and implementation of DoD and FAA SUA Actions. As part of the lead agency-cooperating agency relationship, the DoD and the FAA will determine responsibilities, consistent with this MOU, for funding the preparation of NEPA documentation (40 CFR §1501.6(b)(5)) and, if appropriate, decision implementation measures (40 CFR §1505.3).

E. Amendments. If either party determines that it is necessary to amend this MOU, it will notify the other party in writing of the specific change(s) desired, with proposed language and the reason(s) for the amendment. The proposed amendment will become effective upon written agreement of both parties.

VI. Effective Date.

This MOU is effective from the last signature date below until rescinded or amended.

SIGNED:

DATE: 30 Sep 2019

SCHATZ.ROWAYNE.A.JR.1177943386 Digitally signed by SCHATZ.ROWAYNE.A.JR.1177943386 Date: 2019.09.30 18:45:49 -04'00'

Executive Director, DoD Policy Board
On Federal Aviation

DATE: OCT 17 2019

ANGELA RENEE MCCULLOUGH Digitally signed by ANGELA RENEE MCCULLOUGH Date: 2019.10.17 06:33:25 -04'00'

VP, Mission Support Services
Federal Aviation Administration

Appendix 8. FAA Special Use Airspace Environmental Processing Procedures

1. GENERAL.

This appendix provides guidance for FAA participation in the environmental review of proposed special use airspace (SUA) actions. The requirements in this appendix are in addition to the airspace proposal processing procedures contained in this order. The aeronautical and environmental processes for SUA proposals involve some overlap and the actions taken, or modifications made, to the proposal in one process may affect the actions required and/or the outcome of the other process.

2. BACKGROUND.

a. The SUA program is designed to accommodate national security requirements and military training activities wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations.

b. SUA proposals are subject to both NEPA and aeronautical processing requirements. Since the FAA is the approval authority for SUA actions, the agency cannot make a final decision on any particular SUA proposal prior to the completion of the NEPA and aeronautical processing phases.

3. POLICIES.

The following policies apply to the processing of SUA proposals:

a. In addition to responsibilities of a cooperating agency as defined in 40 CFR Parts 1500–1508, FAA must:

1. Provide to DOD information and technical expertise within the special expertise and jurisdiction of the FAA as it relates to the proposed action.

2. Resolve or respond to environmental issues raised during the NEPA process relating to aeronautical issues.

3. If an EA or EIS is required, identify and evaluate the environmental impacts relating to the proposal.

4. Furnish to DOD the names of organizations, agencies, or other parties the FAA believes may be interested in the DOD proposal.

5. Notify and coordinate FAA proposed airspace actions with DOD components that may be affected.

b. FAA Participation in NEPA Meetings. The FAA must participate in scoping, interagency, and public NEPA meetings conducted by the proponent. The Air Traffic Service Center Director (or the Director's Designee) with responsibility for Cooperating Agency participation will determine FAA representation in the meetings. When FAA personnel participate in such meetings:

1. The audience must be informed that FAA participation is to provide aeronautical technical expertise and is not to be construed as FAA endorsement or support of any SUA proposal, and that no decisions concerning the proposal will be made at the meeting.

2. If requested, the FAA will provide an overview of the procedures followed by the FAA for processing SUA proposals.

3. The FAA will advise the audience of the Service Center handling the processing of the aeronautical proposal. Additionally, the audience should be advised that written comments on the aeronautical aspects of the proposal should be submitted during the public comment period associated with the aeronautical circularization.

c. FAA NEPA Compliance Options. In accordance with CEQ regulations, the FAA must participate in the NEPA process as a cooperating agency. The FAA may adopt an EA or EIS prepared by DOD if the FAA independently evaluates the information in the document and takes full responsibility for the scope and content that addresses FAA actions. Where the proponent's NEPA documentation is insufficient, additional NEPA documentation will be required before the FAA can make a final decision. The FAA may ask the applicant to correct any deficiencies and re-submit the assessment if the FAA is not satisfied (see FAA Order 1050.1, "Environmental Impacts: Policies and Procedures," paragraphs 2-2.1 and 2-2.2). The FAA must issue its own FONSI and/or ROD. See FAA Order 1050.1, paragraph 8-2.

d. Time Limits for Final Environmental Impact Statements (EISs). If three years have expired following the approval of a final EIS, and major steps towards implementation have not commenced, a written reevaluation of the adequacy, accuracy, and validity of the final EIS must be prepared by the proponent. Written reevaluations must comply with the requirements set forth in FAA Order 1050.1, paragraph 9-2. The proponent may also elect to prepare new documentation if circumstances dictate.

4. LEAD AND COOPERATING AGENCIES.

The FAA/DOD MOU provides for the application of "lead agency" and "cooperating agency" responsibilities in the SUA environmental process. When the DOD is the proponent, the DOD will serve as lead agency for the evaluation of SUA environmental impacts and the preparation and processing of environmental documents.

a. The DOD, as lead agency, will determine whether an SUA proposal:

1. Is a major action significantly affecting the quality of the human environment requiring an environmental impact statement (EIS);

2. Requires an environmental assessment (EA); or,

3. Is categorically excluded in accordance with FAA Order 1050.1, paragraphs 5-6.1 through 5-6.5.

These determinations must be coordinated with the FAA at the earliest possible time to prevent delay in preparation of any required NEPA documentation.

b. The appropriate FAA Service Center, as identified in response to a request to participate, will act as the point of contact for Cooperating Agency status during the evaluation of the proposal's environmental study. The FAA may use documents prepared by the proponent in its environmental process, provided the FAA has independently reviewed the scope and content of the documentation and assumes responsibility as described in subparagraph 3c, above. (See FAA Order 1050.1, paragraph 8-2.)

c. Where the actions of one agency are subject to a categorical exclusion and the actions of the other agency with respect to the same SUA is not subject to a categorical exclusion, then the other agency will prepare the appropriate environmental documentation. The applicability of a categorical exclusion to parts of the action will be noted in the environmental document. FAA budget constraints may delay processing and implementation of a proponent's proposal when the categorical exclusion of the proponent is not listed in FAA Order 1050.1, chapter 5.

5. SUA ENVIRONMENTAL CONCERNS.

In addition to other environmental considerations required under NEPA, CEQ regulations, and FAA Order 1050.1, the following are items the FAA expects to be considered, if applicable, in SUA environmental documents. This list should not be considered all-inclusive:

a. Other Times by NOTAM. When specified in the proposal, this provision permits access to the SUA area 24 hours per day. The environmental document must address the potential impact for use of the SUA during the "other times by NOTAM" period.

b. Flares and Chaff. Address the potential impact of flare and/or chaff use when this activity is specified in the SUA proposal.

c. "No Action Alternative." Include discussion of this alternative.

d. Coastal Zone Consistency Determination. Include if applicable.

e. Proposed Airspace Parameters. The environmental analysis in the EA or EIS for the SUA proposal must match the airspace parameters contained in the SUA proposal (for example, boundaries, altitudes, times of use, and type and extent of activities).

f. Non–participating Aircraft. Include a discussion of the effect of the SUA proposed action on non–participating aircraft, if applicable.

g. Mitigation. As defined in CEQ regulations, mitigation includes:

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
5. Compensating for the impact by replacing or providing substitute resources or environments.

h. Cumulative Impacts. Cumulative impacts on the environment are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or Non–Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

i. Consultation. Consultation must be conducted in accordance with the National Historic Preservation Act, Section 106; the Endangered Species Act, Section 7; FAA Order 1210.20.

"American Indian and Alaska Native Tribal Consultation Policy and Procedures," and other applicable laws, regulations, and Department of Transportation and FAA Orders.

6. INTERAGENCY SUA ENVIRONMENTAL PLANNING MEETING.

To facilitate early coordination between the FAA and the DOD proponent, the DOD proponent must make a request to the FAA for Cooperating Agency status as soon as the proponent decides to initiate the environmental process.

When the FAA is invited to participate as a cooperating agency, it is suggested that a planning meeting be held as soon as practical. The agenda of the meeting should be based on the type of SUA proposal, the extent of the planned environmental analysis.

a. The appropriate Regional Military Representative (Milrep) will coordinate the proponent's request for a planning meeting with the appropriate Service Center Director (or his/her designee). Representatives of the FAA, the proponent, and the proponent's NEPA consultant, if any, should be invited to participate by the military representative.

b. The meeting should include discussion of pertinent issues, including but not limited to:

1. The type of SUA proposal to be submitted,
2. Identification of points–of–contact and establishment of liaison between concerned parties,
3. Determination of the appropriate type of environmental documentation,
4. The appropriate extent of FAA participation,
5. Identification of potentially significant impacts,
6. Consideration of the need for scoping, interagency, and/or other public meetings,
7. Setting processing milestones,
8. Clarifying any questions the proponent may have regarding the FAA's requirements for the environmental analysis and documentation; and,
9. Exchange of information on any environmental and/or aeronautical concerns in the area of potential effect.

1. Brief attendees on the airspace processing procedures in Part 5 of this order that will apply to the SUA proposal.

2. Encourage the proponent to work proactively with aviation user groups and individuals to address aeronautical issues as they arise. This should ensure early consideration of aeronautical mitigation.

d. At the meeting, the Service Center environmental representative should:

1. Brief attendees on the environmental processing procedures in FAA Order 1050.1 and Chapter 32 of this order that apply to the SUA proposal.

2. Encourage the proponent to work proactively with other Federal, State, and Local agencies; Tribal Governments; and the public on environmental concerns as they arise. This will ensure that mitigation to address environmental concerns is considered early in the process.

3. Advise attendees that the FAA cannot render a final determination on the environmental effects of the SUA proposal until after completion of the proponent's environmental process, the FAA's aeronautical process, the FAA's independent review of the proponent's environmental documentation, and any additional environmental analyses conducted by the FAA.

e. The meeting format may be tailored to the needs of the specific proposal. It may be conducted by a teleconference, if permitted by the scope of the proposal or if necessary due to funding or other constraints.

f. Additional meetings should be scheduled as needed to discuss changes, revise milestones, share updated environmental and/or aeronautical impact data or public comments, discuss alteration of the proposal in order to mitigate valid aeronautical objections, incorporate agreements by the proponent to mitigate environmental impacts, or discuss other matters.

7. RELATIONSHIPS AND TIMING OF ENVIRONMENTAL AND AERONAUTICAL PROCESSES.

a. SUA proposals are subject to both environmental and aeronautical processing requirements. These processes are separate but closely related. Any actions by a proponent to mitigate environmental impacts, and/or changes to the proposal to address valid aeronautical objections, may alter the type and extent of environmental analysis required.

b. Normally, the SUA proponent will initiate the environmental process well in advance of submitting an actual SUA proposal to the FAA for review. The appropriate Milrep should inform the appropriate Service Center as soon as possible after receiving notice that a DOD proponent plans to initiate the environmental study process. A letter requesting FAA participation in the environmental study process as a Cooperating Agency should be forwarded to the Director of the Office of Mission Support, Airspace Services, at FAA Headquarters.

c. Proponents should submit SUA proposals to the FAA Service Center prior to completion of the NEPA process. This will enable the FAA to initiate the aeronautical processing phase prior to completion of any required NEPA documents, which will facilitate the earlier consideration of aeronautical factors that may result in modification of the proposal and may affect the environmental analysis. In all cases, the FAA will defer a final decision on the proposal until the required NEPA process is completed.

d. During the aeronautical processing of a proposal with alternatives, only the alternative submitted to the FAA in accordance with Part 5. of this order will be subjected to the aeronautical process described in this order (such as non-rulemaking circularization or Notice of Proposed Rulemaking (NPRM)) by the FAA. However, all reasonable alternatives, including the alternative of no action, must be evaluated in the environmental document.

8. SERVICE CENTER PROCEDURES.

a. Normally, FAA participation in the SUA environmental process will begin at the headquarters level with a request by the proponent of an SUA proposal for the FAA to participate in the process as a Cooperating Agency. However, the FAA point of contact will generally be a representative from the Air Traffic Organization at the Service Center level. Close coordination is required between the Service Center Airspace Specialist and Environmental Specialist throughout the process. This will ensure that FAA concerns are provided to the proponent for consideration, and that NEPA and DOT/FAA environmental requirements are met.

b. Once notified of the initiation of the environmental process by the SUA proponent, the Service Center environmental specialist should request that the proponent provide a minimum of five copies of all preliminary, draft, and final environmental documents for FAA review. The Service Center environmental specialist will forward three copies of the documents to FAA Headquarters (Mission Support, Airspace Services, and Airspace Policy Group).

c. To the extent practicable, the Service Center should provide FAA representation at pre–scoping, scoping, and/or other NEPA public meetings concerning the SUA proposal. If requested by the Service Center, representation from the headquarters Airspace Policy and/or Airspace Management Groups will be provided.

d. Service Center Airspace Specialist Responsibilities:

1. Coordinate requests from the Milrep to schedule an interagency SUA environmental planning meeting with the Service Center Director (or the Director's designee) and the environmental specialist.

2. Participate in interagency SUA environmental planning meetings as directed, by the Service Center Director (or the Director's designee). (See paragraph 6, above.)

3. Participate in pre–scoping, scoping and/or other public meetings as directed.

4. Provide information and assistance as required to the proponent regarding the aeronautical aspects of the proposal and processing procedures under Part 5 of this order.

5. Coordinate with and assist the environmental specialist in the review of environmental documents to ensure consideration of pertinent aeronautical issues. Compare the SUA proposal parameters with the analysis in the environmental document to ensure that the analysis is consistent with the proponent's airspace request. Provide corrections and/or comments to the environmental specialist for transmittal to the proponent.

6. Maintain liaison with the proponent's environmental team to determine if any comments received pertain to aeronautical issues; provide information regarding the aeronautical aspects of alternatives developed by the proponent.

7. Provide to the proponent aeronautical impact information obtained from the formal aeronautical study conducted in accordance with Chapter 21 of this order and during the aeronautical public comment period. As required, negotiate with the proponent to modify the proposal to mitigate valid aeronautical objections or adverse aeronautical impact.

8. Upon receipt of the SUA proposal, initiate processing in accordance with Part 5 of this order.

(a). Determine if an Informal Airspace Meeting will be held in accordance with the procedures in Part 5. of this order. If a meeting is planned, request participation by the proponent to explain and answer questions about the proposal.

NOTE:

Informal Airspace Meetings are optional for SUA proposals. Normally, they are held only if the Service Center determines that there is a need to obtain additional aeronautical facts and information relevant to the SUA proposal under study. Informal airspace meetings may also be held based on known or anticipated controversy of the proposal.

(b). Complete the appropriate rulemaking or non–rulemaking processing requirements as defined in Part 5 of this order.

9. In consultation with the Service Center environmental specialist and the Regional Counsel, review the proponent's decision document to ensure that it is consistent with any modifications made to the SUA proposal, if applicable, and that any agreed upon aeronautical mitigation measures are included.

10. If the Service Center airspace specialist recommends approval of the SUA proposal, submit the completed proposal package to the Airspace Policy Group for final review and determination. The Airspace and Rules Team will receive the SUA package from the Airspace Policy Group for review of any environmental documentation.

e. Service Center Environmental Specialist Responsibilities.

1. Coordinate as required with the Service Center Airspace Specialist regarding SUA matters.

2. Notify the Airspace Policy Group when informed of scheduled interagency SUA environmental planning meetings. Participate in such meetings as directed by the Service Center Director (or the Director's designee) (see paragraph 6 above).

3. Provide information as required to the SUA proponent regarding FAA environmental requirements and concerns.

4. In coordination with the Service Center Airspace Specialist, review the SUA proponent's environmental documents to ensure that applicable impact categories and any specific FAA environmental concerns are considered. After each review, forward any corrections and FAA comments to the proponent.

5. Review the proponent's final document to assess whether it meets the standards for an adequate document under NEPA, the CEQ regulations, DOT Order 5610.1C, and FAA Order 1050.1. Following consultation with the Regional Counsel, determine if the FAA considers the document adequate for adoption. Provide documentation of the results of this review and a recommendation regarding FAA adoption to the Airspace Policy Group.

6. If the proponent takes the position that a categorical exclusion (CATEX) applies to an SUA proposal: (a). Determine if FAA Order 1050.1, Chapter 5, Categorical Exclusions, lists the CATEX. Verify that no extraordinary circumstances exist that would preclude use of the CATEX for the SUA proposal. Determine what additional environmental analysis would be required if the CATEX is not listed.

(b). Document the results of the review in subparagraph (a) above, and submit the findings to the Airspace Policy Group.

7. Retain the administrative record in accordance with FAA retention guidelines. If DOD is the lead agency for the proposed project, a copy of relevant documents in its administrative record should be obtained and included in the FAA record.

9. MISSION SUPPORT, AIRSPACE SERVICES, AIRSPACE MANAGEMENT GROUP PROCEDURES:

a. Review the proponent's environmental document(s) to verify that the analysis matches the parameters specified in the SUA aeronautical proposal and that any required environmental issues are considered. Conduct this review simultaneously with the Service Center's review as described in paragraph 8. Provide corrections and identify deficiencies to the Service Center Airspace and/or Environmental Specialist for transmittal to the proponent.

b. The Airspace Policy Group must review the proponent's environmental documents for content and compliance with NEPA, CEQ regulations, and applicable DOT and FAA Orders. Coordinate with the Airspace Policy Group as needed, regarding concerns, corrections, or other comments on aeronautical impacts. Provide FAA Headquarters comments to the Service Center Environmental Specialist for transmittal to the proponent.

c. Provide concurrent assistance and policy guidance regarding SUA environmental processing to the Service Center environmental specialist upon request.

d. Coordinate with the Airspace Policy Group as needed for additional information concerning the SUA proposal and aeronautical impact matters.

e. Review the proponent's Final EIS or EA/Finding of No Significant Impact (FONSI), and the Service Center environmental specialists' comments regarding compliance with NEPA, CEQ, and applicable DOT and FAA requirements. Determine if the document is suitable for adoption by the FAA. Prepare FAA adoption memorandum and provide a copy to the Airspace Policy Group for inclusion in the airspace docket or case file.

f. Review the proponent's and Service Center environmental specialist's comments regarding applicability of a CATEX. If the CATEX does not apply, determine if additional environmental analysis is required. Consider if CATEX documentation is required in accordance with FAA Order 1050.1,chapter 5. Provide a copy of the determination to Airspace Policy Group for inclusion in the airspace docket or case file.

g. As appropriate, coordinate with the FAA Office of the Chief Counsel, Airports and Environmental Law Division. See FAA Order 1050.1, paragraphs 2–2.1b(2)(b); 4–3.3, 5–2a(2) and b(10); 5–3e; 6–4a; 7–1.2b; 7–1.2d(3)(c); 8–2c;8–7; 9–2e; 10–2b, d, e; 10–3b; 10–4a(2); 10–6a(2), b; 11–3; 11–4a, b.

h. Prepare a separate FAA FONSI and/or Record of Decision (ROD) if circumstances dictate. Provide a copy to the Airspace Policy Group for inclusion in the airspacedocket or case file.

i. In the case of rulemaking SUA actions, assist the Airspace Policy Group by preparing the statement to be included in the ENVIRONMENTAL REVIEW sections of the NPRM and the Final Rule. In the case of non–rulemaking SUA actions, prepare the FONSI/ROD for the airspace case file for the non–rulemaking documentation and notify the public in accordance with FAA Order 1050.1, paragraph 6–2.2b.

10. MISSION SUPPORT, AIRSPACE SERVICES, AIRSPACE POLICY GROUP:

a. Upon receipt at headquarters, review the proponent's environmental document(s) from an airspace/aeronautical impact perspective to verify that the environmental analysis matches the parameters specified in the SUA proposal and that any required aeronautical issues are considered. Conduct this review simultaneously with the Service Center aeronautical review as described in paragraph 8 above.

b. Ensure that the Service Center airspace specialist provided a copy of the proposal, including any environmental documentation, to the Service Center environmental specialist.

c. Coordinate with the Airspace Policy Group, as required, to discuss the environmental analysis of the proposal.

d. Submit all SUA NPRMs, final rules, and non–rulemaking airspace determinations to the Airspace Management Group for coordination prior to issuance.

e. Insert the following statement in the environmental review section of SUA NPRMs:

"This proposal will be subject to appropriate environmental impact analysis by the FAA prior to any final FAA regulatory action."

f. Consult with the Airspace Policy Group to draft the text for the ENVIRONMENTAL REVIEW section for SUA final rules. In the case of rulemaking SUA actions, assist the Airspace Policy Group by preparing the statement to be included in the ENVIRONMENTAL REVIEW sections of the NPRM and the Final Rule. In the case of non–rulemaking SUA actions, prepare the FONSI/ROD for the airspace case file for the non–rulemaking documentation and notify the public in accordance with FAA Order 1050.1, paragraph 6–2.2b.

Note:
For "Direct–to–Final–Rule" actions which are categorically excluded under FAA Order 1050.1, the following statement may be inserted in the environmental review section of the Final Rule:

> *"This action is categorically excluded under FAA Order 1050.1, "Environmental Impacts: Policies and Procedures," Paragraph (insert Paragraph Number). Therefore, this action is not subject to further environmental review."*

g. Coordinate with the Airspace Policy Group to determine the status of FAA adoption of the proponent's environmental document(s). Obtain a copy of FAA adoption documentation for inclusion in the rulemaking docket file or non–rulemaking airspace case file.

h. Complete final airspace processing requirements in accordance with Part 5 of this order, including the final determination on the airspace request. In all cases the FAA must not issue a final decision until after the NEPA process is completed; the FAA has adopted the proponent's EIS or EA, as applicable; and any additional FAA environmental requirements are satisfied.

IICEP Recipients List Environmental Assessment

West Virginia & Virginia (Evers MOA)

AGENCY		FIRST NAM	LAST NAME	TITLE	ORGANIZATION	MAILING ADDRESS	CITY	STATE	ZIP CODE
FEDERAL									
USFWS VA	Mr.	Troy	Anderson	Supervisor	USFWS NE Region, Virginia Field Office	6669 Short Ln	Gloucester	VA	23061
USFWS WV	MR.	John	Schmidt	Project Leader	United States Fish and Wildlife Service West Virginia Field	90 Vance Drive	Elkins	WV	26241
USACE				Director	West Virginia USACE	502 Eighth Street	Huntington	WV	25701-2070
US National Forests WV	Mr.	Shawn	Cochran	Forest Supervisor	US National Forest	200 Sycamore Street	Elkins	WV	23241
US National Forests VA	Ms	Beth	LeMaster	Forest Supervisor	US National Forest	5162 Valleypointe Park	Roanoke	VA	24019
U.S. Geological Service	Ms.	Pamela	Ambrose	Administrative Officer	U.S. Geological Services	12201 Sunrise Valley Dr	Reston	VA	20192
USEPA	Mr.	Cosmo	Servidio	Regional Administrato	Environmental Protection Agency	Methodist Building 1060 Chapline Street	Wheeling	WV	26003-2995
National Radio Quiet Zone(NRQZ)	Ms.	Paulette	Woody	NRQZ Administrator	Green Bank Observatory	155 Observatory Road	Green Bank	WV	24944-0002
STATE									
Dept. of Environmental Quality				Director	Dept. of Environmental Protection	601 57th Street SE	Charleston	WV	25304
SHPO (WV)	Mr.	Randall	Reid-Smith	State Historic Preservation Officer	Historic Preservation Office	1900 Kanawha Blvd East	Charleston	WV	25305-0300
SHPO (VA)	Ms.	Julie	Langan	State Historic Preservation Officer	Dept. of Historic Resources	2801 Kensington Ave	Richmond	VA	23221
Dept. of Transportation (Aviation Division)				Director	USDOT Federal Aviation Administraton	301 Eagle Mt. Road, #13	Charleston	WV	23511
Dept. of Forestry	Mr.	Barry	Cook	State Forester/Director		7 Players Club Dr.	Charleston	WV	25311
Dept. of Natural Resources & Wildlife Resources Division (WV)	Mr.	John	Schmidt	Project Leader	West Virginia Ecological Services	90 Vance Drive	Elkins	WV	26241-9475
Dept. of Natural Resources & Wildlife Resources Division (VA)				Supervisor	Virginia Ecological Services	6669 Short Lane	Gloucester	VA	23061-4410
Dept. of Agriculture		Kris	Warner	State Director	West Virginia Dept. of Agriculture	1550 Earl Core Road, Su	Morgantown	WV	26505
LOCAL BY COUNTY									
Harrison									
Chamber of Commerce & Economic Development	Ms.	Kim	Drummond	Director	Harrison County Chamber of Commerce	520 Main St.	Clarksburg	WV	26301

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AGENCY		FIRST NAM	LAST NAME	TITLE	ORGANIZATION	MAILING ADDRESS	CITY	STATE	ZIP CODE
Barbour									
Chamber of Commerce					Barbour County Commision	26 North Main Street	Philippi	WV	26416
Economic Development					Barbour County Economic Development	134 N. Main Street	Philippi	WV	26416
Tucker									
Chamber of Commerce					Tucker County Chamber of Commerce	410 William Ave	Davis	WV	26260
Economic Development	Mr.	Steve	Leyh	Executive Director	Tucker County Development Authority	264 E. Avenue	Thomas	WV	26292
Pendleton									
Chamber of Commerce	Ms.	Laura	Brown	Executive Director	Pendleton County Chamber of Commerce	47 Maple Avenue	Franklin	WV	26807
Economic Development					Pendleton County Economic and Community Development Authority	P.O. Box 602	Franklin	WV	26807
Lewis									
Chamber of Commerce					Lewis County Chamber of Commerce	115 East 2nd Street	Weston	WV	26452
Economic Development					Lewis County Economic Development	110 Center Ave, 2nd Flo	Weston	WV	26452
Upshur									
Chamber of Commerce	Ms.	Tammy	Reger	Director	Buckhannon-Upshur Chamber of Commerce	14 East Main Street	Buckhannon	WV	26201
Economic Development	Mr.	Robert	Hinton	Executive Director	Upshur County Development Authority	30 E. Main Street	Budkhannon	WV	26201
Randolph									
Chamber of Commerce	Ms.	Lisa	Messinger Wood	Executive Director	Elkins-Randolph County Chamber	10 Eleventh Street	Elkins	WV	26241
Economic Development				Director	Randolph Development Authority	10 Eleventh Street	Elkins	WV	26241
Highland (VA)									
Chamber of Commerce				Director	Highland County Chamber of Commerce	P.O. Box 223	Monterey	VA	24465
Economic Development	Ms.	Betty	Mitchell	Executive Director	The Highland Center of Economic Development	61 Highland Center Driv	Monterey	VA	24465

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West Virginia & Virginia (Evers MOA)

AGENCY		FIRST NAM	LAST NAME	TITLE	ORGANIZATION	MAILING ADDRESS	CITY	STATE	ZIP CODE
Braxton									
Chamber of Commerce					Summersville Area Chamber of Commerce	19 Memorial Park Rd	Summersville	WV	26651
Economic Development	Mr.	Richard	Jarvis	Director	Braxton County Development Authority	250 Skidmore Lane	Sutton	WV	26601
Webster									
Chamber of Commerce	Ms.	Nicole	Dudley	Director	Richwood Area Chamber of Commerce	38 Edgewood Avenue	Richwood	WV	26261
Economic Development				Director	Webster County Economic Development Authority	P.O. Box 4	Webster Springs	WV	26288
Pocahontas									
Chamber of Commerce & Economic Development				Director	Marlinton West Virginia Chamber of Commerce	P.O. Box 272	Marlinton	WV	24954
Alleghany (VA)									
Alleghany Highlands Chamber of Commerce & Tourism	Ms.	Pam	Warren	Office Manager	Alleghany Highlands Chamber of Commerce & Tourism	110 Mall Road	Covington	VA	24426
Alleghany Highlands Economic Development Corporation	Ms.	Marla	Akridge	Executive Director	Alleghany Highlands Economic Development Corporation	1000 Dabney Dr, Suite 5	Clifton Forge	VA	24422
Nicholas									
Chamber of Commerce				Director	Richwood Chamber of Commerce	One East Main Street	Richwood	WV	26261
Economic Development				Director	New River Gorge Regional Development Authority	116 N. Heber Street	Beckley	WV	25801
Greenbrier									
Chamber of Commerce				Director	Greater Greenbrier Chamber	200 W. Washington Stre	Lewisburg	WV	24901
Economic Development				Director	Greenbrier Valley Partnership	804 Industrial Park, Suit	Maxwelton	WV	24957
Bath (VA)									
Chamber of Commerce				Director	County of Bath Chamber of Commerce	2696 Main Street	Hot Springs	VA	24445
Borteourt (VA)									
Chamber of Commerce				Director	Botetourt Country Chamber	13 West Main Street	Fincastle	VA	24090
Economic Development				Director	Botetourt County Economic Development	One W. Main Street	Fnicastle	VA	24090

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West Virginia & Virginia (Evers MOA)

AGENCY		FIRST NAM	LAST NAME	TITLE	ORGANIZATION	MAILING ADDRESS	CITY	STATE	ZIP CODE
TRIBES									
Delaware Tribe		Chester	Brooks	Chief	Eastern Oklahoma	5100 Tuxedo Blvd.	Bartlesville	OK	74006-2838
Delaware Nation		Deborah	Dotson	President	Southern Plains	P.O. Box 825	Anadarko	OK	73005
Cherokee Nation		Bill John	Baker	Principal Chief	Eastern Oklahoma	P.O. Box 948	Tahlequah	OK	74465
United Keetoowah Band of Cherokee Indians		Joe	Bunch	Chief	Eastern Oklahoma	P.O. Box 746	Tahlequah	OK	74465
Seneca Nation of Indians		Rickey	Armstrong, Sr.	President	Eastern	90 Ohi:Yo' Way	Salamanca	NY	14779
Seneca-Cayuga Nation (formerly Tribe of Oklahoma)		William	Fisher	Chief	Eastern Oklahoma	23701 South 655 Road	Grove	OK	74344
Tuscarora Nation		Leo	Henry	Chief	Eastern	2006 Mt. Hope Road	Lewistown	NY	14092
Chickahominy Indian Tribe	Mr.	Stephen	Adkins	Chief	Chickahominy Indian Tribe	7240 Adkins Road	Charles City	VA	23030
Chickahominy Indians	Mr.	Gene	Adkins	Chief	Chickahominy Indians - Eastern Division	3120 Mount Pleasant Road	Providence Forge	VA	23140
Monacan Indian Nation	Mr.	Dan	Branham	Chief	Monacan Indian Nation	104 Walnut Place	Lynchburg	VA	24502
Nansemond Indian Tribe	Mr.	Lee	Lockamy	Chief	Nansemond Indian Tribe	5005 Mosby Road	Virginia Beach	VA	23455
Rappahannock Tribe	Ms.	Anne	Richardson	Chief	Rappahannock Tribe	5036 Indian Neck Road	Indian Neck	VA	23148
Upper Mattaponi Indian Tribe	Mr.	Frank	Adams	Chief	Upper Mattaponi Indian Tribe	P.O. Box 184	King William	VA	23086
Airports									
Elkins-Randolph Co (EKN)	Ms.	Mary	Ricottilli	Airport Manager	Elkins-Randolph Cty Airport Authority	400 Airport Rd	Elkins	WV	26241
Upshur Co Regional (W22)	Mr.	James	Wilt	Airport Manager	Bunkhannon-Upshor Airport Authority	630 Airport Rd, Box 104	Bunkhannon	WV	26201
Greenbrier Valley (LWB)	Mr.	Stephen	Snyder	Airport Manager	Greenbrier Cty Airport Authority	584 Airport Rd, Box 1	Lewisburg	WV	24901
Ingalls Field (HSP)	Mr.	Eric	Thompson	Airport Manager	Bath Cty Airport Authority	6240 Airport Rd	Hot Springs	WV	24445
Deer Creek Farm (WV00)	Mr.	Phillip	Doolittle	Airport Manager	(privately owned airport)	199 Green Bank Rd	Arbovale	WV	24915
Hannah Field (7VA9)	Mr.	Rob	Nicholson	Airport Manager	(privately owned airport)	1317 N. Bay Shore Dr	Virginia Beach	VA	23451
Singleton (97VA)	Mr/Mrs	John&Cath	Singleton	Airport Manager	(privately owned airport)	PO Box 116	Warm Springs	VA	24484
Green Bank Observatory (WV52)	Mr.	Michael	Holstine	Airport Manager	(privately owned airport)	PO Box 2	Green Bank	WV	24944
Special Interest Groups									
AOPA	Mr.	Rune	Duke	Sr Director	Aircraft Owners & Pilots Association	50 F St. NW, Ste 750	Washington	DC	20001
Green Bank Observatory (NRQZ)	Ms.	Paulette	Woody	NRQZ Administrator	Green Bank Observatory	155 Observatory Rd, PO	Green Bank	WV	24944
NBAA	Ms.	Heidi	Williams	Director	National Business Aviation Association	1200 G St. NW, Ste 1100	Washington	DC	20005
Valley Aerospace Team	Mr	Charles	Neff	President	Valley Aerospace Team	1115 Middlebrook Rd	Staunton	VA	24401

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS 20762-5157

13 June 2019

Mr. Randall Reid-Smith
State Historic Preservation Officer
Historic Preservation Office
1900 Kanawha Blvd East
Charleston, WV 25305-0300

Dear Mr. Reid-Smith

The United States Air Force National Guard Bureau (NGB) at Joint Base Andrews, Maryland would like to initiate consultation with your office under Section 106 of the National Historic Preservation Act of 1966 (NHPA), and its implementing regulations (36 CFR §800).

Pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321 et seq.), the NGB is preparing an Environmental Assessment (EA) for a proposed undertaking that will analyze potential effects to human health and the natural environment, including historic and traditional cultural properties. The purpose of the undertaking is to accommodate training requirements of the113th Wing (WG) of the District of Columbia Air National Guard (DCANG), stationed at Joint Base Andrews. The project consists of the Modification and Addition to Airspace Utilization for the Evers Military Operations Airspace.

A complete project description is provided in Attachment 1, but in general, the proposed action would replace the existing Evers Military Operations Airspace with four Military Operations Airspaces and establish three additional Air Traffic Control Assigned Airspaces (ATCAA). The current configuration of the Evers Military Operations Airspace is too small to meet the continuing training program for Air Combat Command units and for air refueling operations, which are critical training multipliers for the F-16C fleet. The proposed expansion has been coordinated with FAA representatives at the Washington Center to minimize civilian air traffic encroachment while maintaining its boundaries within a single air traffic controlling center.

The NGB has reviewed the proposed undertaking for potential effects to historic properties and, because there will be no associated ground disturbance, consider them to be minimal. Under the proposed action, there would be no infrastructure changes, no ground-disturbing activities, no weapons firing, and no ordnance deployment within the proposed air spaces. No supersonic operations or release of chaff and flares would be conducted. Weekend and night time operations at all altitudes would be limited.

Because there will be no ground disturbing activities or alterations to historic properties, the NGB has reached a determination of No Historic Properties Affected for the proposed undertaking. We respectfully request your concurrence with our determination. A hard copy of

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS 20762-5157

13 June 2019

Ms. Julie Langan
State Historic Preservation Officer
Dept. of Historic Resources
2801 Kensington Ave
Richmond, VA 23221

Dear Ms. Langan

The United States Air Force National Guard Bureau (NGB) at Joint Base Andrews, Maryland would like to initiate consultation with your office under Section 106 of the National Historic Preservation Act of 1966 (NHPA), and its implementing regulations (36 CFR §800).

Pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321 et seq.), the NGB is preparing an Environmental Assessment (EA) for a proposed undertaking that will analyze potential effects to human health and the natural environment, including historic and traditional cultural properties. The purpose of the undertaking is to accommodate training requirements of the113th Wing (WG) of the District of Columbia Air National Guard (DCANG), stationed at Joint Base Andrews. The project consists of the Modification and Addition to Airspace Utilization for the Evers Military Operations Airspace.

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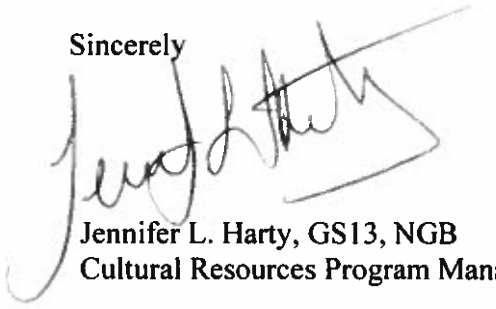
Because there will be no ground disturbing activities or alterations to historic properties, the NGB has reached a determination of No Historic Properties Affected for the proposed undertaking. We respectfully request your concurrence with our determination. A hard copy of

the Draft and Final EA documents will be provided to your office for review should you request one. We can also provide an electronic copy if you would prefer.

In order for the NGB to address any concerns in a timely manner, please respond within 30 days of receipt of this letter. Please provide any comments to Jennifer Harty, Cultural Resources Program Manager, 3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157 or by email at Jennifer.L.Harty.civ@mail.mil. Thank you for your assistance and we look forward to working with you on this undertaking.

Sincerely



Jennifer L. Harty, GS13, NGB
Cultural Resources Program Manager

Attachment:
Description of proposed action

The Air National Guard (ANG) is preparing an Environmental Assessment (EA) to consider the potential consequences to the human and natural environment associated with the modification, expansion, and utilization of the Evers Military Operations Airspace (MOA) to accommodate the training requirements of the 113th Wing (WG), District of Columbia. The 113 WG, stationed at Joint Base Andrews, Maryland, mission is to maintain a well-trained and well-equipped F-16C squadron available for prompt mobilization during war and to aid Allies during emergencies.

The purpose of the action is to expand the existing Evers MOA laterally and vertically to train and prepare for current and future conflicts. The existing MOA is 16 nautical mile [NM] x 30 NM over Highland County, Virginia and Pocahontas and Randolph counties, West Virginia. The airspace begins at 1,000 feet (ft) above ground level (AGL) and continues to 17,999 ft above mean sea level (MSL). The 113 WG maintains 30 combat mission ready (CMR) pilots to meet the Ready Aircrew Program (RAP) sortie and event requirements for training activities over land each year. The primary drivers of airspace shape, size, and feature requirements are the F-16C RAP Tasking Memorandum, in conjunction with AFI 11-2F-16V. These requirements define the minimum number and type of annual sorties, simulator missions and specific training events specialized aircrews must accomplish to sustain CMR pilots. Considering the notional timeline requirements for the F-16C, an 80 NM x 40 NM airspace represents the minimum lateral airspace required to effectively train to the 113 WG's widely varying missions.

The proposed Evers MOA airspace would occur over all or parts of the following West Virginia counties (Harrison, Barbour, Tucker, Pendleton, Lewis, Upshur, Randolph, Braxton, Webster, Pocahontas, Nicholas, and Greenbrier) and Virginia counties (Highland, Alleghany, Bath, and Botetourt). The Proposed Action would expand beyond the lateral footprint of the current Evers MOA, subdivide the new airspace into five portions (Figure 1) that increase the ability of air traffic control to accommodate civil operations, and establish three Air Traffic Control Assigned Airspaces (ATCAAs) above the MOAs (Figure 2). The components of the Proposed Action include:

- Delineate new airspace
    - Evers North, Center and South MOAs (11,000 ft – 17,999 ft above MSL)
    - Evers Low MOA (1,000 ft AGL – 10,999 ft above MSL)
    - Evers East MOA (1,000 ft AGL to 17,999 ft above MSL)
- Create three ATCAAs
    - Diesel North, Center and South ATCAA (Flight Level [FL]180 – FL230 MSL)

Seven action alternatives were considered but were dismissed from detailed analysis because the alternatives did not meet the purpose and need for the action. The EA will analyze the Proposed Action and the No Action Alternative. Under the No Action Alternative, local and deployed units would continue losing adequate training opportunities, thus degrading the combat capability of the 113 WG.

Through the process of interagency and intergovernmental coordination for environmental planning (IICEP), the ANG will notify relevant federal, state, and local agencies, and federally recognized tribes to request their environmental concerns specific to the Proposed Action. The Draft EA will be available on the 113 WG website and sent to regional libraries to invite public participation during a 45-day comment period. Historic resources under the proposed airspace is depicted in Figure 3.

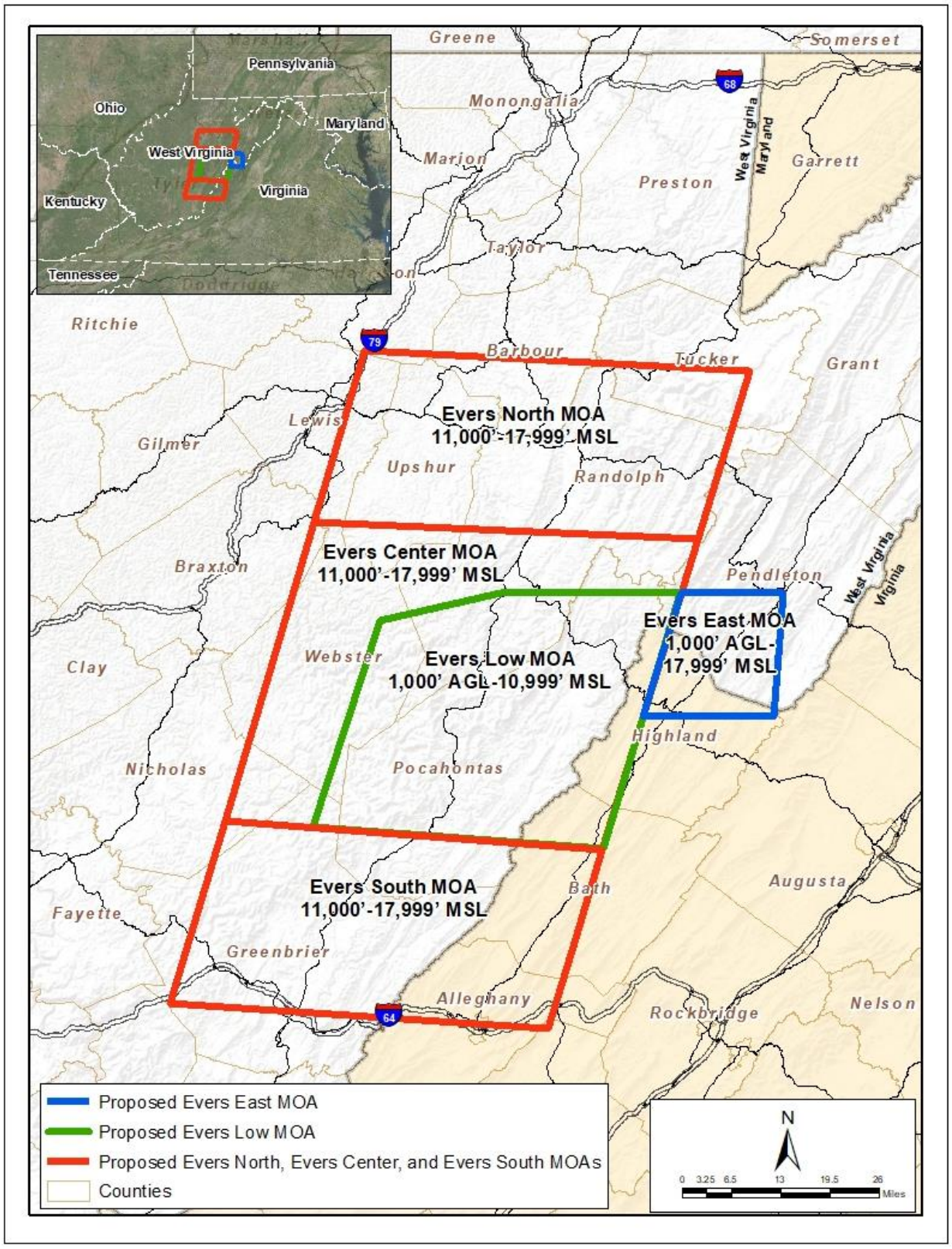


Figure 1. Proposed MOAs

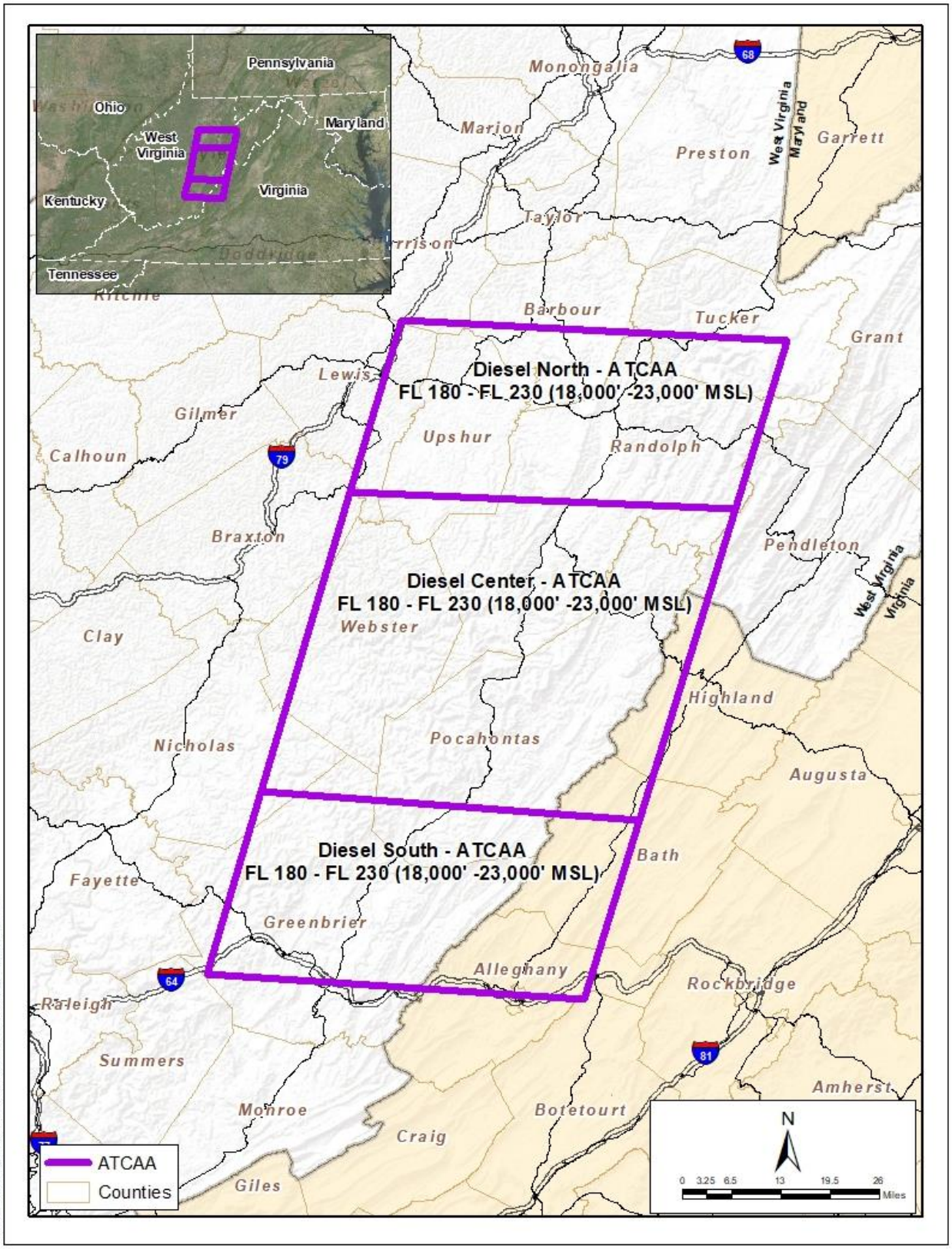


Figure 2. Proposed ATCAAs

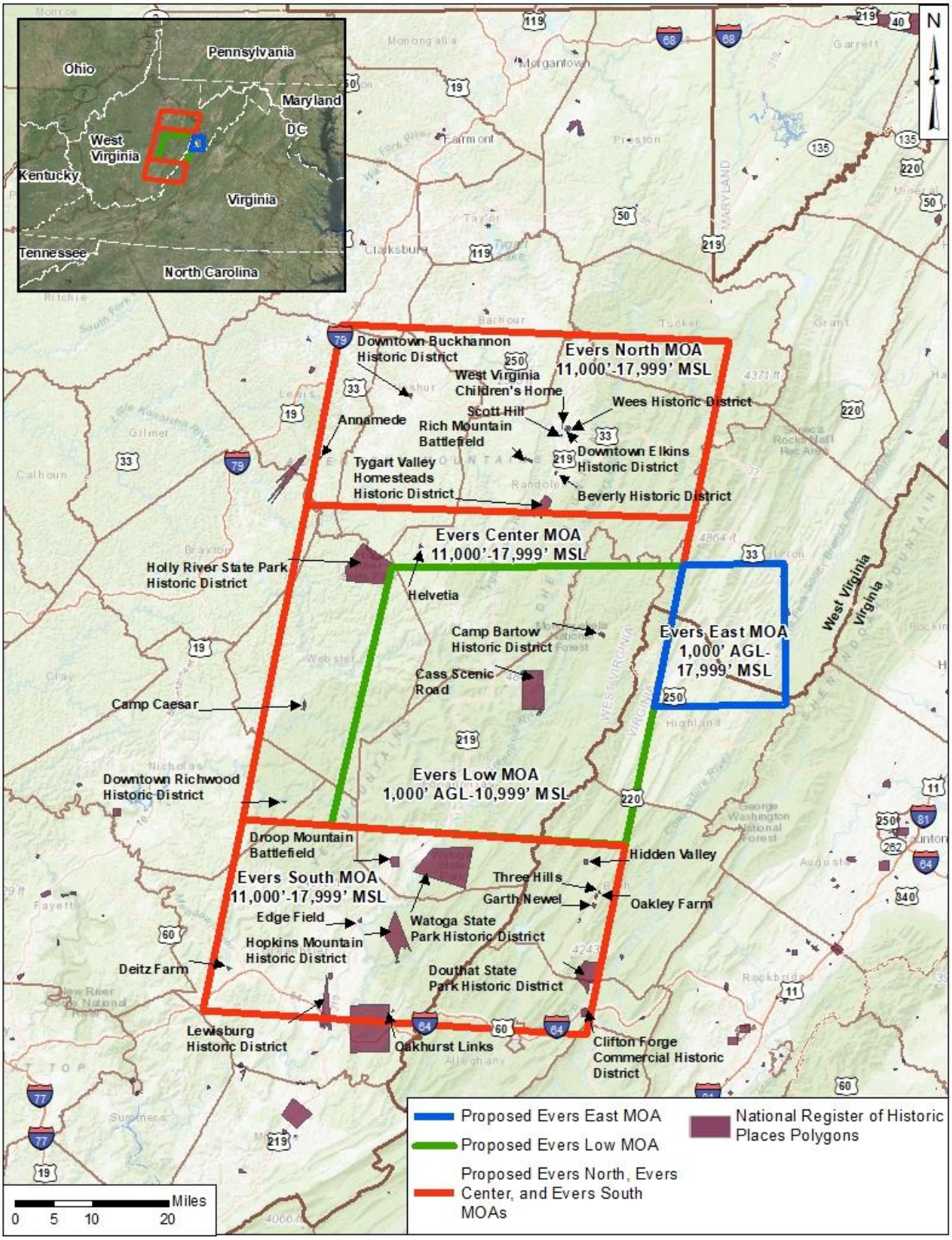


Figure 3. Historic Resources

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS 20762-5157

13 June 2019

Mr. Troy Anderson
Supervisor
USFWS NE Region, Virginia Field Office
6669 Short Ln
Gloucester, VA 23061

Dear Mr. Anderson

The Air National Guard (ANG) Joint Base Andrews, Maryland is preparing an Environmental Assessment (EA) for proposed Modification and Addition of Airspace Utilization of Evers Military Operations Airspace (MOA) to accommodate the113th Wing (WG) training requirements of the District of Columbia Air National Guard (DCANG). Pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321–4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Sections 1500–1508), and 32 CFR Part 989, et seq., the ANG will prepare an EA that considers the potential consequences to human health and the natural environment. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we are writing this letter to advise you of this effort and request your assistance in identifying any potential issues related to the proposal.

The National Guard Bureau (NGB) has invited the Federal Aviation Administration (FAA) to be a cooperating agency in the EA. The EA will assess the effects of the Proposed Action and will include analysis of the required No-Action alternative. Enclosed, please find a detailed description of the Proposed Action (Att.1).

The DCANG's mission is to maintain a well-trained and well-equipped F-16C squadron available for prompt mobilization during war and also provide assistance to Allies during emergencies. The federal mission during peacetime has the combat ready unit assigned to the Air Combat Command (ACC) to carry out missions compatible with training, mobilization readiness, humanitarian, and contingency operations.

The Proposed Action would replace the existing single Evers MOA with four MOA's and establish three Air Traffic Control Assigned Airspaces (ATCAA). The new MOA's would be designated as Evers North, Evers Central, Evers South (11,000 feet to 18,000 feet Mean Sea Level [MSL]), and Evers Low (1,000 feet Above Ground Level [AGL] to 11,000 feet MSL). The three ATCAA's would be Diesel North, Diesel Central, and Diesel South (Flight Level [FL]180 [18,000 feet] to FL230 [23,000 feet]). The ATCAA boundaries would be coincidental with the proposed boundaries of Evers North, Central, and South MOA's.

The current configuration of the Evers MOA is too small to meet the continuing training program for ACC units and for air refueling operations, which are critical training multipliers for the F-16C fleet. The proposed expansion has been coordinated with FAA representatives at the Washington Center to minimize civilian air traffic encroachment while maintaining its boundaries within a single air traffic controlling center.

Under the Proposed Action, there would be no infrastructure changes, no grounddisturbing activities and no ordnance deployment within the proposed MOA's. No supersonic operations or release of chaff and flares would be conducted. Weekend and night time operations at all altitudes would be limited.

The National Guard Bureau intends to maximize the use of electronic transmittals during subsequent coordination phases of this project. A hard copy of the Draft and Final EA documents will be provided to your office for review. Enclosed is a copy of the distribution list for those agencies and organizations to be contacted regarding this EA (Att.2). If you consider any additional agencies should review and comment on this proposal, please feel free to include them in a re-distribution of this letter and the attached materials.

In order for the ANG to address your concerns, in a timely manner, please respond within 30 days of receipt of this letter. Please provide any comments you may have within 30 days of receipt of this letter to me at Ramón E. Ortiz, 3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157 or email to ramon.e.ortiz2.civ@mail.mil. Thank you for your assistance.

Sincerely

RAMÓN E. ORTIZ, P.E.
Technical Lead Environmental Planner
NGB/A4AM - Plans and Requirements

2 Attachments:
1. Description of Proposed Action
2. IICEP Distribution List

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS 20762-5157

13 June 2019

Mr. John Schmidt
Project Leader
United States Fish and Wildlife Service
West Virginia Field Office Ecological Services
90 Vance Drive
Elkins, WV 26241

Dear Mr. Schmidt

The Air National Guard (ANG) Joint Base Andrews, Maryland is preparing an Environmental Assessment (EA) for proposed Modification and Addition of Airspace Utilization of Evers Military Operations Airspace (MOA) to accommodate the113th Wing (WG) training requirements of the District of Columbia Air National Guard (DCANG). Pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321–4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Sections 1500–1508), and 32 CFR Part 989, et seq., the ANG will prepare an EA that considers the potential consequences to human health and the natural environment. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we are writing this letter to advise you of this effort and request your assistance in identifying any potential issues related to the proposal.

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RAMÓN E. ORTIZ, P.E.
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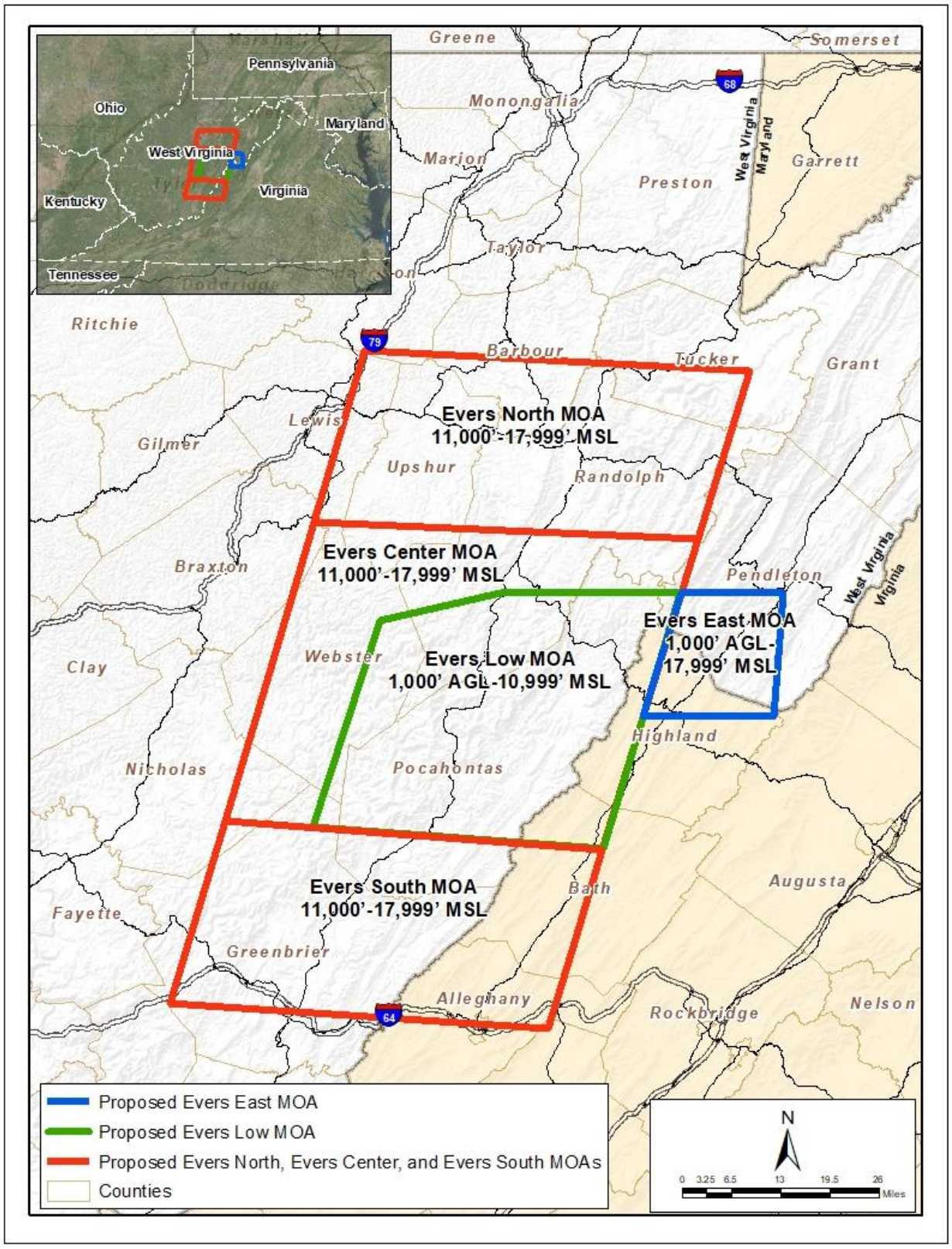

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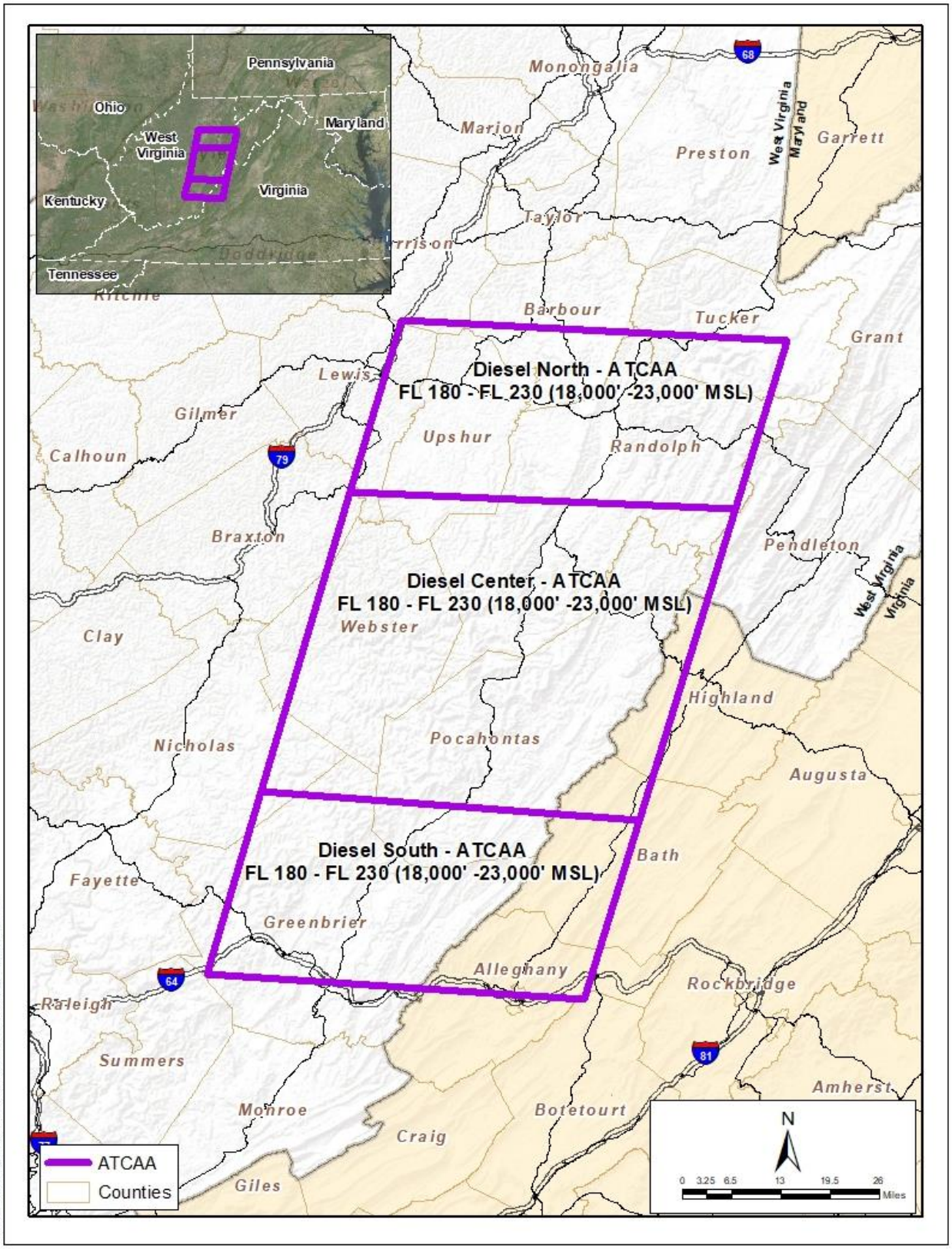

Figure 2. Proposed ATCAAs

IICEP Recipients List Environmental Assessment

West Virginia & Virginia (Evers MOA)

AGENCY		FIRST NAME	LAST NAME	TITLE	ORGANIZATION	MAILING ADDRESS	CITY	STATE	ZIP CODE	PHONE NUMBER	EMAIL ADDRESS
FEDERAL											
USFWS VA	Mr.	Troy	Anderson	Supervisor	USFWS NE Region, Virginia Field Office	6669 Short Ln	Gloucester	VA	23061	(804) 693-6694	
USFWS WV	MR.	John	Schmidt	Project Leader	United States Fish and Wildlife Service West Virginia Field Office Ecological Services	90 Vance Drive	Elkins	WV	26241	304-636-6586	john_schmidt@fws.gov
USACE				Director	West Virginia USACE	502 Eighth Street	Huntington	WV	25701-2070	304-399-5211	
US National Forests WV	Mr.	Shawn	Cochran	Forest Supervisor	US National Forest	200 Sycamore Street	Elkins	WV	23241	(304) 636-1800	
US National Forests VA	Ms	Beth	LeMaster	Forest Supervisor	US National Forest	5162 Valleypointe Parkway	Roanoke	VA	24019	540-265-5100	
U.S. Geological Service	Ms.	Pamela	Ambrose	Administrative Officer	U.S. Geological Services	12201 Sunrise Valley Dr.	Reston	VA	20192	703-648-5953	pambrose@usgs.gov
USEPA	Mr.	Cosmo	Servidio	Regional Administrato	Environmental Protection Agency	Methodist Building 1060 Chapline Street	Wheeling	WV	26003-2995	215-814-2900	R3_RA@epa.gov
National Radio Quiet Zone(NRQZ)	Ms.	Paulette	Woody	NRQZ Administrator	Green Bank Observatory	155 Observatory Road	Green Bank	WV	24944-0002	304-456-2107	nrqz@nrao.edu
STATE											
Dept. of Environmental Quality				Director	Dept. of Environmental Protection	601 57th Street SE	Charleston	WV	25304	304-926-0440	
SHPO (WV) - **Certified Mail**	Mr.	Randall	Reid-Smith	State Historic Preservation Officer	Historic Preservation Office	1900 Kanawha Blvd East	Charleston	WV	25305-0300	304-558-0220	Susan.M.Pierce@wv.gov
SHPO (VA) - **Certified Mail**	Ms.	Julie	Langan	State Historic Preservation Officer	Dept. of Historic Resources	2801 Kensington Ave	Richmond	VA	23221	804-482-6087	julie.langan@dhr.virginia.gov
Dept. of Transportation (Aviation Division)				Director	USDOT Federal Aviation Administraton	301 Eagle Mt. Road, #133	Charleston	WV	23511	304-341-5387	
Dept. of Forestry	Mr.	Barry	Cook	State Forester/Director		7 Players Club Dr.	Charleston	WV	25311	304-558-2788	Barry.L.Cook@wv.gov
Dept. of Natural Resources & Wildlife Resources Division (WV)	Mr.	John	Schmidt	Project Leader	West Virginia Ecological Services	90 Vance Drive	Elkins	WV	26241-9475	304-636-6586	john_schmidt@fws.gov
Dept. of Natural Resources & Wildlife Resources Division (VA)				Supervisor	Virginia Ecological Services	6669 Short Lane	Gloucester	VA	23061-4410	804-693-6694	troy_anderson@fws.gov
Dept. of Agriculture		Kris	Warner	State Director	West Virginia Dept. of Agriculture	1550 Earl Core Road, Suite 101	Morgantown	WV	26505	800-295-8228	
LOCAL BY COUNTY											
Harrison											
Chamber of Commerce & Economic Development	Ms.	Kim	Drummond	Director	Harrison County Chamber of Commerce	520 Main St.	Clarksburg	WV	26301	304-624-6331	
Barbour											
Chamber of Commerce					Barbour County Commision	26 North Main Street	Philippi	WV	26416	304-457-4339	
Economic Development					Barbour County Economic Development	134 N. Main Street	Philippi	WV	26416	304-457-1225	barbourcountywveda.org
Tucker											
Chamber of Commerce					Tucker County Chamber of Commerce	410 William Ave	Davis	WV	26260	304-259-5315	tuckerchamber@canaanvalley.org
Economic Development	Mr.	Steve	Leyh	Executive Director	Tucker County Development Authority	264 E. Avenue	Thomas	WV	26292	304-614-8839	tuckercounty@gmail.com
Pendleton											
Chamber of Commerce	Ms.	Laura	Brown	Executive Director	Pendleton County Chamber of Commerce	47 Maple Avenue	Franklin	WV	26807	304-358-3884	pencowv@sksrt.net
Economic Development					Pendleton County Economic and Community Development Authority	P.O. Box 602	Franklin	WV	26807	304-358-2074	eda@pendletoncounty.com
Lewis											
Chamber of Commerce					Lewis County Chamber of Commerce	115 East 2nd Street	Weston	WV	26452	304-269-2608	
Economic Development					Lewis County Economic Development	110 Center Ave, 2nd Floor	Weston	WV	26452	304-269-4993	lceda@lewiscountywv.org
Upshur											
Chamber of Commerce	Ms.	Tammy	Reger	Director	Buckhannon-Upshur Chamber of Commerce	14 East Main Street	Buckhannon	WV	26201	304-472-1722	info@gbuchamber.com
Economic Development	Mr.	Robert	Hinton	Executive Director	Upshur County Development Authority	30 E. Main Street	Budkhannon	WV	26201	304-472-1757	rob@upshurda.com
Randolph											

Chamber of Commerce	Ms.	Lisa	Messinger Wood	Executive Director	Elkins-Randolph County Chamber	10 Eleventh Street	Elkins	WV	26241	304-636-2717	chamber@erccc.com
Economic Development				Director	Randolph Development Authority	10 Eleventh Street	Elkins	WV	26241	304-637-0803	info@randolphwv.com
Highland (VA)											
Chamber of Commerce				Director	Highland County Chamber of Commerce	P.O. Box 223	Monterey	VA	24465	540-468-2550	
Economic Development	Ms.	Betty	Mitchell	Executive Director	The Highland Center of Economic Development	61 Highland Center Drive	Monterey	VA	24465	540-468-4922	highlandcenterinfo@htcnet.org
Braxton											
Chamber of Commerce					Summersville Area Chamber of Commerce	19 Memorial Park Rd	Summersville	WV	26651	304-872-1588	
Economic Development	Mr.	Richard	Jarvis	Director	Braxton County Development Authority	250 Skidmore Lane	Sutton	WV	26601	304-765-5900	
Webster											
Chamber of Commerce	Ms.	Nicole	Dudley	Director	Richwood Area Chamber of Commerce	38 Edgewood Avenue	Richwood	WV	26261	304-846-6790	rwdchamber@frontier.com
Economic Development				Director	Webster County Economic Development Authority	P.O. Box 4	Webster Springs	WV	26288	304-847-2145	wcda@websterwv.com
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Economic Development				Director	New River Gorge Regional Development Authority	116 N. Heber Street	Beckley	WV	25801	304-254-8115	info@NRGRDA.org
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NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS 20762-5157

13 June 2019

Sample Agency Letter
Sample Agency
Sample Address
Sample Address

To Whom it May Concern

The Air National Guard (ANG) Joint Base Andrews, Maryland is preparing an Environmental Assessment (EA) for proposed Modification and Addition of Airspace Utilization of Evers Military Operations Airspace (MOA) to accommodate the113th Wing (WG) training requirements of the District of Columbia Air National Guard (DCANG). Pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321–4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Sections 1500–1508), and 32 CFR Part 989, et seq., the ANG will prepare an EA that considers the potential consequences to human health and the natural environment. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we are writing this letter to advise you of this effort and request your assistance in identifying any potential issues related to the proposal.

The National Guard Bureau (NGB) has invited the Federal Aviation Administration (FAA) to be a cooperating agency in the EA. The EA will assess the effects of the Proposed Action and will include analysis of the required No-Action alternative. Enclosed, please find a detailed description of the Proposed Action (Att.1).

The DCANG's mission is to maintain a well-trained and well-equipped F-16C squadron available for prompt mobilization during war and also provide assistance to Allies during emergencies. The federal mission during peacetime has the combat ready unit assigned to the Air Combat Command (ACC) to carry out missions compatible with training, mobilization readiness, humanitarian, and contingency operations.

The Proposed Action would replace the existing single Evers MOA with four MOA's and establish three Air Traffic Control Assigned Airspaces (ATCAA). The new MOA's would be designated as Evers North, Evers Central, Evers South (11,000 feet to 18,000 feet Mean Sea Level [MSL]), and Evers Low (1,000 feet Above Ground Level [AGL] to 11,000 feet MSL). The three ATCAA's would be Diesel North, Diesel Central, and Diesel South (Flight Level [FL]180 [18,000 feet] to FL230 [23,000 feet]). The ATCAA boundaries would be coincidental with the proposed boundaries of Evers North, Central, and South MOA's.

The current configuration of the Evers MOA is too small to meet the continuing training program for ACC units and for air refueling operations, which are critical training multipliers for the F-16C fleet. The proposed expansion has been coordinated with FAA representatives at the Washington Center to minimize civilian air traffic encroachment while maintaining its boundaries within a single air traffic controlling center.

Under the Proposed Action, there would be no infrastructure changes, no grounddisturbing activities and no ordnance deployment within the proposed MOA's. No supersonic operations or release of chaff and flares would be conducted. Weekend and night time operations at all altitudes would be limited.

The National Guard Bureau intends to maximize the use of electronic transmittals during subsequent coordination phases of this project. A hard copy of the Draft and Final EA documents will be provided to your office for review. Enclosed is a copy of the distribution list for those agencies and organizations to be contacted regarding this EA (Att.2). If you consider any additional agencies should review and comment on this proposal, please feel free to include them in a re-distribution of this letter and the attached materials.

In order for the ANG to address your concerns, in a timely manner, please respond within 30 days of receipt of this letter. Please provide any comments you may have within 30 days of receipt of this letter to me at Ramón E. Ortiz, 3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157 or email to ramon.e.ortiz2.civ@mail.mil. Thank you for your assistance.

Sincerely

RAMÓN E. ORTIZ, P.E.
Technical Lead Environmental Planner
NGB/A4AM - Plans and Requirements

2 Attachments:
1. Description of Proposed Action
2. IICEP Distribution List

The Air National Guard (ANG) is preparing an Environmental Assessment (EA) to consider the potential consequences to the human and natural environment associated with the modification, expansion, and utilization of the Evers Military Operations Airspace (MOA) to accommodate the training requirements of the 113th Wing (WG), District of Columbia. The 113 WG, stationed at Joint Base Andrews, Maryland, mission is to maintain a well-trained and well-equipped F-16C squadron available for prompt mobilization during war and to aid Allies during emergencies.

The purpose of the action is to expand the existing Evers MOA laterally and vertically to train and prepare for current and future conflicts. The existing MOA is 16 nautical mile [NM] x 30 NM over Highland County, Virginia and Pocahontas and Randolph counties, West Virginia. The airspace begins at 1,000 feet (ft) above ground level (AGL) and continues to 17,999 ft above mean sea level (MSL). The 113 WG maintains 30 combat mission ready (CMR) pilots to meet the Ready Aircrew Program (RAP) sortie and event requirements for training activities over land each year. The primary drivers of airspace shape, size, and feature requirements are the F-16C RAP Tasking Memorandum, in conjunction with AFI 11-2F-16V. These requirements define the minimum number and type of annual sorties, simulator missions and specific training events specialized aircrews must accomplish to sustain CMR pilots. Considering the notional timeline requirements for the F-16C, an 80 NM x 40 NM airspace represents the minimum lateral airspace required to effectively train to the 113 WG's widely varying missions.

The proposed Evers MOA airspace would occur over all or parts of the following West Virginia counties (Harrison, Barbour, Tucker, Pendleton, Lewis, Upshur, Randolph, Braxton, Webster, Pocahontas, Nicholas, and Greenbrier) and Virginia counties (Highland, Alleghany, Bath, and Botetourt). The Proposed Action would expand beyond the lateral footprint of the current Evers MOA, subdivide the new airspace into five portions (Figure 1) that increase the ability of air traffic control to accommodate civil operations, and establish three Air Traffic Control Assigned Airspaces (ATCAAs) above the MOAs (Figure 2). The components of the Proposed Action include:

- Delineate new airspace
    - Evers North, Center and South MOAs (11,000 ft – 17,999 ft above MSL)
    - Evers Low MOA (1,000 ft AGL – 10,999 ft above MSL)
    - Evers East MOA (1,000 ft AGL to 17,999 ft above MSL)
- Create three ATCAAs
    - Diesel North, Center and South ATCAA (Flight Level [FL]180 – FL230 MSL)

Seven action alternatives were considered but were dismissed from detailed analysis because the alternatives did not meet the purpose and need for the action. The EA will analyze the Proposed Action and the No Action Alternative. Under the No Action Alternative, local and deployed units would continue losing adequate training opportunities, thus degrading the combat capability of the 113 WG.

Through the process of interagency and intergovernmental coordination for environmental planning (IICEP), the ANG will notify relevant federal, state, and local agencies, and federally recognized tribes to request their environmental concerns specific to the Proposed Action. The Draft EA will be available on the 113 WG website and sent to regional libraries to invite public participation during a 45-day comment period.

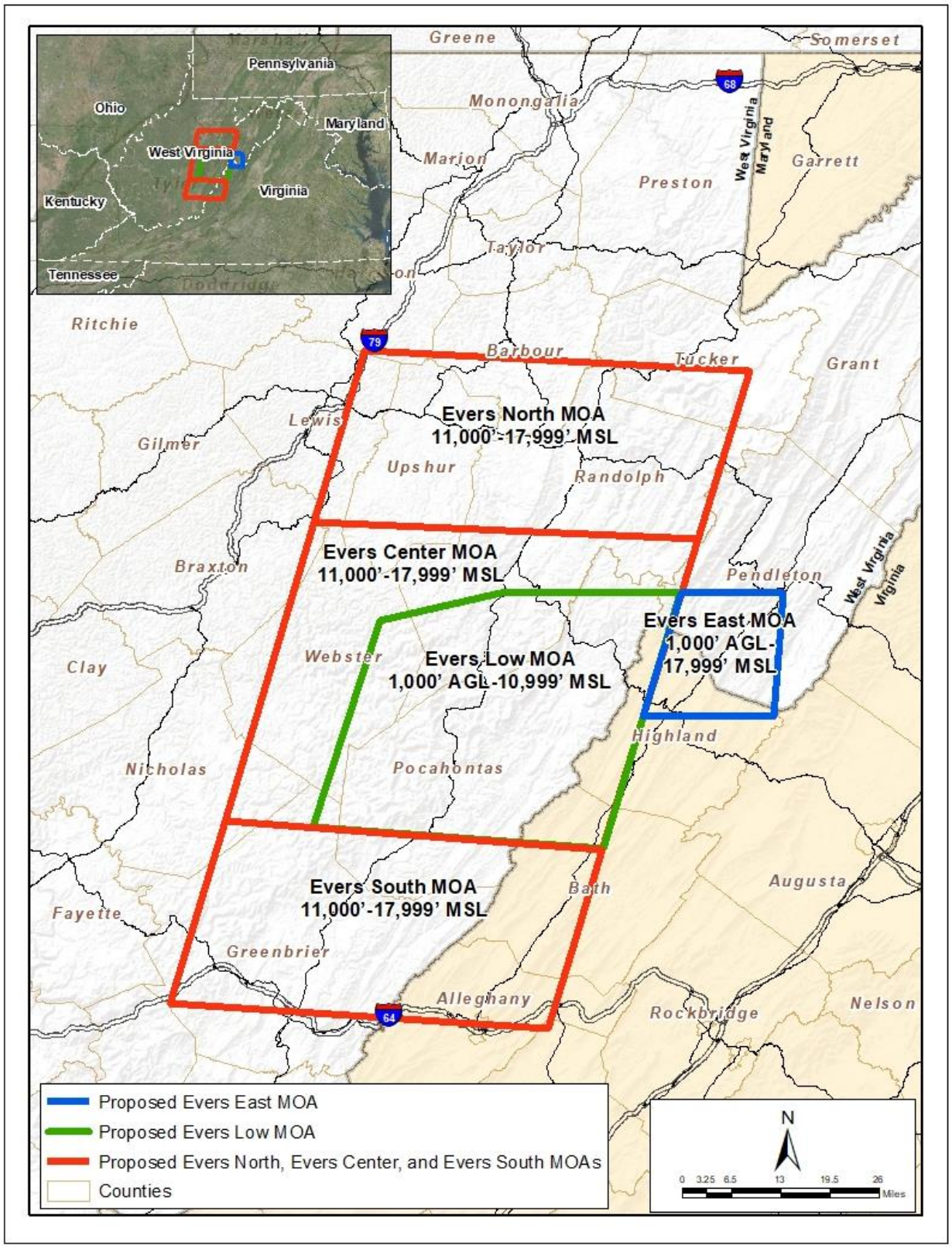

Figure 1. Proposed MOAs

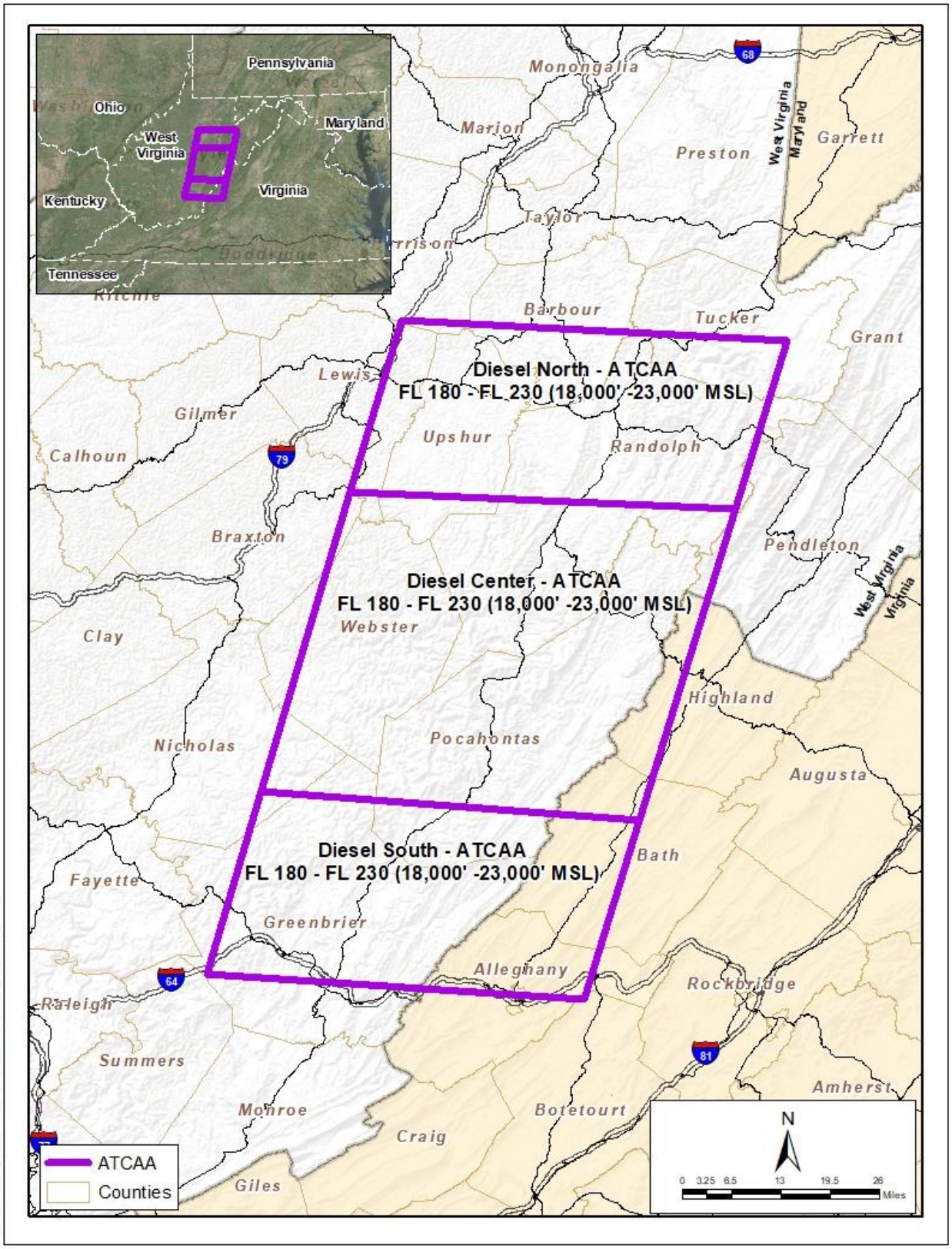

Figure 2. Proposed ATCAAs

IICEP Recipients List Environmental Assessment

West Virginia & Virginia (Evers MOA)

AGENCY		FIRST NAME	LAST NAME	TITLE	ORGANIZATION	MAILING ADDRESS	CITY	STATE	ZIP CODE	PHONE NUMBER	EMAIL ADDRESS
FEDERAL											
USFWS VA	Mr.	Troy	Anderson	Supervisor	USFWS NE Region, Virginia Field Office	6669 Short Ln	Gloucester	VA	23061	(804) 693-6694	
USFWS WV	MR.	John	Schmidt	Project Leader	United States Fish and Wildlife Service West Virginia Field Office Ecological Services	90 Vance Drive	Elkins	WV	26241	304-636-6586	john_schmidt@fws.gov
USACE				Director	West Virginia USACE	502 Eighth Street	Huntington	WV	25701-2070	304-399-5211	
US National Forests WV	Mr.	Shawn	Cochran	Forest Supervisor	US National Forest	200 Sycamore Street	Elkins	WV	23241	(304) 636-1800	
US National Forests VA	Ms	Beth	LeMaster	Forest Supervisor	US National Forest	5162 Valleypointe Parkway	Roanoke	VA	24019	540-265-5100	
U.S. Geological Service	Ms.	Pamela	Ambrose	Administrative Officer	U.S. Geological Services	12201 Sunrise Valley Dr.	Reston	VA	20192	703-648-5953	pambrose@usgs.gov
USEPA	Mr.	Cosmo	Servidio	Regional Administrato	Environmental Protection Agency	Methodist Building 1060 Chapline Street	Wheeling	WV	26003-2995	215-814-2900	R3_RA@epa.gov
National Radio Quiet Zone(NRQZ)	Ms.	Paulette	Woody	NRQZ Administrator	Green Bank Observatory	155 Observatory Road	Green Bank	WV	24944-0002	304-456-2107	nrqz@nrao.edu
STATE											
Dept. of Environmental Quality				Director	Dept. of Environmental Protection	601 57th Street SE	Charleston	WV	25304	304-926-0440	
SHPO (WV) - **Certified Mail**	Mr.	Randall	Reid-Smith	State Historic Preservation Officer	Historic Preservation Office	1900 Kanawha Blvd East	Charleston	WV	25305-0300	304-558-0220	Susan.M.Pierce@wv.gov
SHPO (VA) - **Certified Mail**	Ms.	Julie	Langan	State Historic Preservation Officer	Dept. of Historic Resources	2801 Kensington Ave	Richmond	VA	23221	804-482-6087	julie.langan@dhr.virginia.gov
Dept. of Transportation (Aviation Division)				Director	USDOT Federal Aviation Administraton	301 Eagle Mt. Road, #133	Charleston	WV	23511	304-341-5387	
Dept. of Forestry	Mr.	Barry	Cook	State Forester/Director		7 Players Club Dr.	Charleston	WV	25311	304-558-2788	Barry.L.Cook@wv.gov
Dept. of Natural Resources & Wildlife Resources Division (WV)	Mr.	John	Schmidt	Project Leader	West Virginia Ecological Services	90 Vance Drive	Elkins	WV	26241-9475	304-636-6586	john_schmidt@fws.gov
Dept. of Natural Resources & Wildlife Resources Division (VA)				Supervisor	Virginia Ecological Services	6669 Short Lane	Gloucester	VA	23061-4410	804-693-6694	troy_anderson@fws.gov
Dept. of Agriculture		Kris	Warner	State Director	West Virginia Dept. of Agriculture	1550 Earl Core Road, Suite 101	Morgantown	WV	26505	800-295-8228	
LOCAL BY COUNTY											
Harrison											
Chamber of Commerce & Economic Development	Ms.	Kim	Drummond	Director	Harrison County Chamber of Commerce	520 Main St.	Clarksburg	WV	26301	304-624-6331	
Barbour											
Chamber of Commerce					Barbour County Commision	26 North Main Street	Philippi	WV	26416	304-457-4339	
Economic Development					Barbour County Economic Development	134 N. Main Street	Philippi	WV	26416	304-457-1225	barbourcountywveda.org
Tucker											
Chamber of Commerce					Tucker County Chamber of Commerce	410 William Ave	Davis	WV	26260	304-259-5315	tuckerchamber@canaanvalley.org
Economic Development	Mr.	Steve	Leyh	Executive Director	Tucker County Development Authority	264 E. Avenue	Thomas	WV	26292	304-614-8839	tuckercounty@gmail.com
Pendleton											
Chamber of Commerce	Ms.	Laura	Brown	Executive Director	Pendleton County Chamber of Commerce	47 Maple Avenue	Franklin	WV	26807	304-358-3884	pencowv@sksrt.net
Economic Development					Pendleton County Economic and Community Development Authority	P.O. Box 602	Franklin	WV	26807	304-358-2074	eda@pendletoncounty.com
Lewis											
Chamber of Commerce					Lewis County Chamber of Commerce	115 East 2nd Street	Weston	WV	26452	304-269-2608	
Economic Development					Lewis County Economic Development	110 Center Ave, 2nd Floor	Weston	WV	26452	304-269-4993	lceda@lewiscountywv.org
Upshur											
Chamber of Commerce	Ms.	Tammy	Reger	Director	Buckhannon-Upshur Chamber of Commerce	14 East Main Street	Buckhannon	WV	26201	304-472-1722	info@gbuchamber.com
Economic Development	Mr.	Robert	Hinton	Executive Director	Upshur County Development Authority	30 E. Main Street	Budkhannon	WV	26201	304-472-1757	rob@upshurda.com
Randolph											

Chamber of Commerce	Ms.	Lisa	Messinger Wood	Executive Director	Elkins-Randolph County Chamber	10 Eleventh Street	Elkins	WV	26241	304-636-2717	chamber@erccc.com
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NBAA	Ms.	Hedi	Williams	Director	National Business Aviation Association	1200 G St. NW, Ste 1100	Washington	DC	20005	202-783-9255	hwilliams@nbaa.org

DEPARTMENT OF THE AIR FORCE
113TH WING (ANG)
JOINT BASE ANDREWS MD

13 June 2019

Sample Tribes Letter
Sample Recipient
Sample Address
Sample Address
Sample Address

Dear Sample Recipient

The Air National Guard (ANG) at Joint Base Andrews, Maryland is preparing an Environmental Assessment (EA) for the proposed Modification and Addition of Airspace Utilization Evers Military Operations Airspace (MOA). The project would accommodate the113th Wing (WG) training requirements of the District of Columbia Air National Guard (DCANG), stationed at Joint Base Andrews. Pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321–4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Sections 1500–1508), and 32 CFR Part 989, et seq., the ANG will prepare an EA that considers the potential consequences to human health and the natural environment.

The National Guard Bureau (NGB) has invited the Federal Aviation Administration (FAA) to be a cooperating agency in the EA. The EA will assess the effects of the proposed action and will include analysis of the required no-action alternative. Enclosed, please find a description of proposed action (Att.1). In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we are writing this letter to advise you of this effort and to offer an invitation to consult with NGB on the project.

The DCANG's mission is to maintain a well-trained and well-equipped F-16C squadron available for prompt mobilization during war and also provide assistance to Allies during emergencies. The federal mission during peacetime has the combat ready unit assigned to the Air Combat Command (ACC) to carry out missions compatible with training, mobilization readiness, humanitarian, and contingency operations.

The proposed action would replace the existing Evers Military Operations Airpsace (MOA) with four MOA's and establish three Air Traffic Control Assigned Airspaces (ATCAA). The new MOA's would be Evers North, Evers Central, Evers South (11,000 feet to 18,000 feet Mean Sea Level [MSL]), and Evers Low (1,000 feet Above Ground Level [AGL] to 11,000 feet MSL). The three ATCAA's would be Diesel North, Diesel Central, and Diesel South (Flight Level [FL]180 [18,000 feet] to FL230 [23,000 feet]). The ATCAA boundaries would be coincidental with the proposed boundaries of Evers North, Central, and South MOA's. The current configuration of the Evers MOA is too small to meet the continuing training program for

ACC units and for air refueling operations, which are critical training multipliers for the F-16C fleet. The proposed expansion has been coordinated with FAA representatives at the Washington Center to minimize civilian air traffic encroachment while maintaining its boundaries within a single air traffic controlling center.

The ANG has reviewed the proposed project for potential effects on historic properties and, because there will be no associated ground disturbance, consider them to be minimal. Under the proposed action, there would be no infrastructure changes, no ground-disturbing activities, no weapons firing, and no ordnance deployment within the proposed MOAs. No supersonic operations or release of chaff and flares would be conducted in the low airspace. Weekend and night time operations at all altitudes would be limited.

ANG intends to maximize the use of electronic transmittals during subsequent coordination phases of this project. A hard copy of the Draft and Final EA documents will be provided to your office for review. Enclosed is a copy of the distribution list for those agencies and organizations to be contacted regarding this EA (Att.2). If you consider any additional agencies should review and comment on this proposal, please feel free to include them in a re-distribution of this letter and the attached materials.

In order for the ANG to address your concerns, in a timely manner for both the Tribe and the proposed undertaking, please respond within 30 days of receipt of this letter. Please provide any comments to Jennifer Harty, Cultural Resources Program Manager, 3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157 or email to Jennifer.L.Harty.civ@mail.mil. Thank you for your assistance and we look forward to working with you on this undertaking.

MACDONALD.KEITH.GRAVENER.1074300711 Digitally signed by MACDONALD.KEITH.GRAVENER.1074300711 Date: 2019.05.17 16:43:22 -04'00'

KEITH G. MACDONALD, Colonel, ANG
Commander, 113th Wing

2 Attachments:
1. Description of Proposed Action
2. IICEP Distribution List

The Air National Guard (ANG) is preparing an Environmental Assessment (EA) to consider the potential consequences to the human and natural environment associated with the modification, expansion, and utilization of the Evers Military Operations Airspace (MOA) to accommodate the training requirements of the 113th Wing (WG), District of Columbia. The 113 WG, stationed at Joint Base Andrews, Maryland, mission is to maintain a well-trained and well-equipped F-16C squadron available for prompt mobilization during war and to aid Allies during emergencies.

The purpose of the action is to expand the existing Evers MOA laterally and vertically to train and prepare for current and future conflicts. The existing MOA is 16 nautical mile [NM] x 30 NM over Highland County, Virginia and Pocahontas and Randolph counties, West Virginia. The airspace begins at 1,000 feet (ft) above ground level (AGL) and continues to 17,999 ft above mean sea level (MSL). The 113 WG maintains 30 combat mission ready (CMR) pilots to meet the Ready Aircrew Program (RAP) sortie and event requirements for training activities over land each year. The primary drivers of airspace shape, size, and feature requirements are the F-16C RAP Tasking Memorandum, in conjunction with AFI 11-2F-16V. These requirements define the minimum number and type of annual sorties, simulator missions and specific training events specialized aircrews must accomplish to sustain CMR pilots. Considering the notional timeline requirements for the F-16C, an 80 NM x 40 NM airspace represents the minimum lateral airspace required to effectively train to the 113 WG's widely varying missions.

The proposed Evers MOA airspace would occur over all or parts of the following West Virginia counties (Harrison, Barbour, Tucker, Pendleton, Lewis, Upshur, Randolph, Braxton, Webster, Pocahontas, Nicholas, and Greenbrier) and Virginia counties (Highland, Alleghany, Bath, and Botetourt). The Proposed Action would expand beyond the lateral footprint of the current Evers MOA, subdivide the new airspace into five portions (Figure 1) that increase the ability of air traffic control to accommodate civil operations, and establish three Air Traffic Control Assigned Airspaces (ATCAAs) above the MOAs (Figure 2). The components of the Proposed Action include:

- Delineate new airspace
    - Evers North, Center and South MOAs (11,000 ft – 17,999 ft above MSL)
    - Evers Low MOA (1,000 ft AGL – 10,999 ft above MSL)
    - Evers East MOA (1,000 ft AGL to 17,999 ft above MSL)
- Create three ATCAAs
    - Diesel North, Center and South ATCAA (Flight Level [FL]180 – FL230 MSL)

Seven action alternatives were considered but were dismissed from detailed analysis because the alternatives did not meet the purpose and need for the action. The EA will analyze the Proposed Action and the No Action Alternative. Under the No Action Alternative, local and deployed units would continue losing adequate training opportunities, thus degrading the combat capability of the 113 WG.

Through the process of interagency and intergovernmental coordination for environmental planning (IICEP), the ANG will notify relevant federal, state, and local agencies, and federally recognized tribes to request their environmental concerns specific to the Proposed Action. The Draft EA will be available on the 113 WG website and sent to regional libraries to invite public participation during a 45-day comment period.

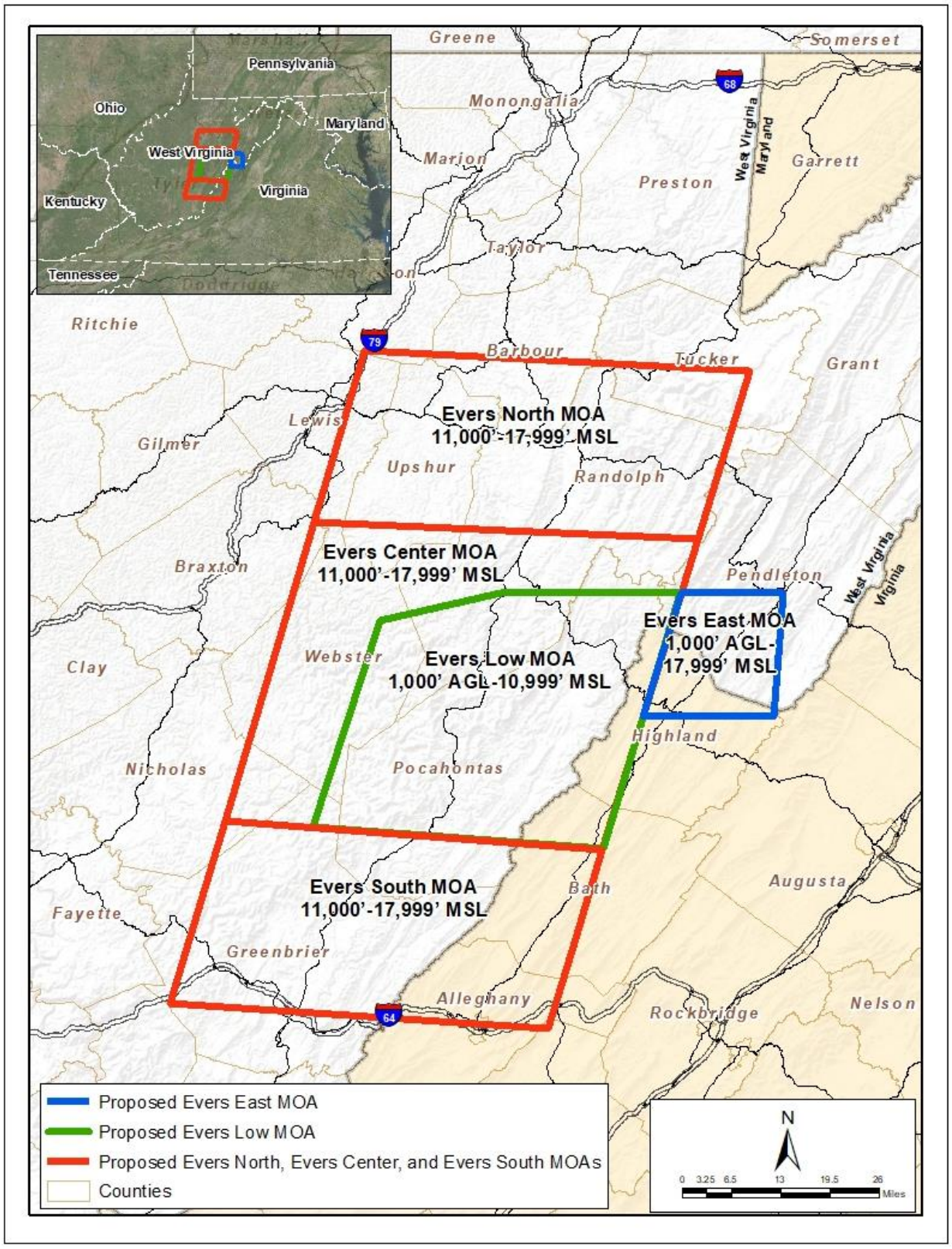


Figure 1. Proposed MOAs

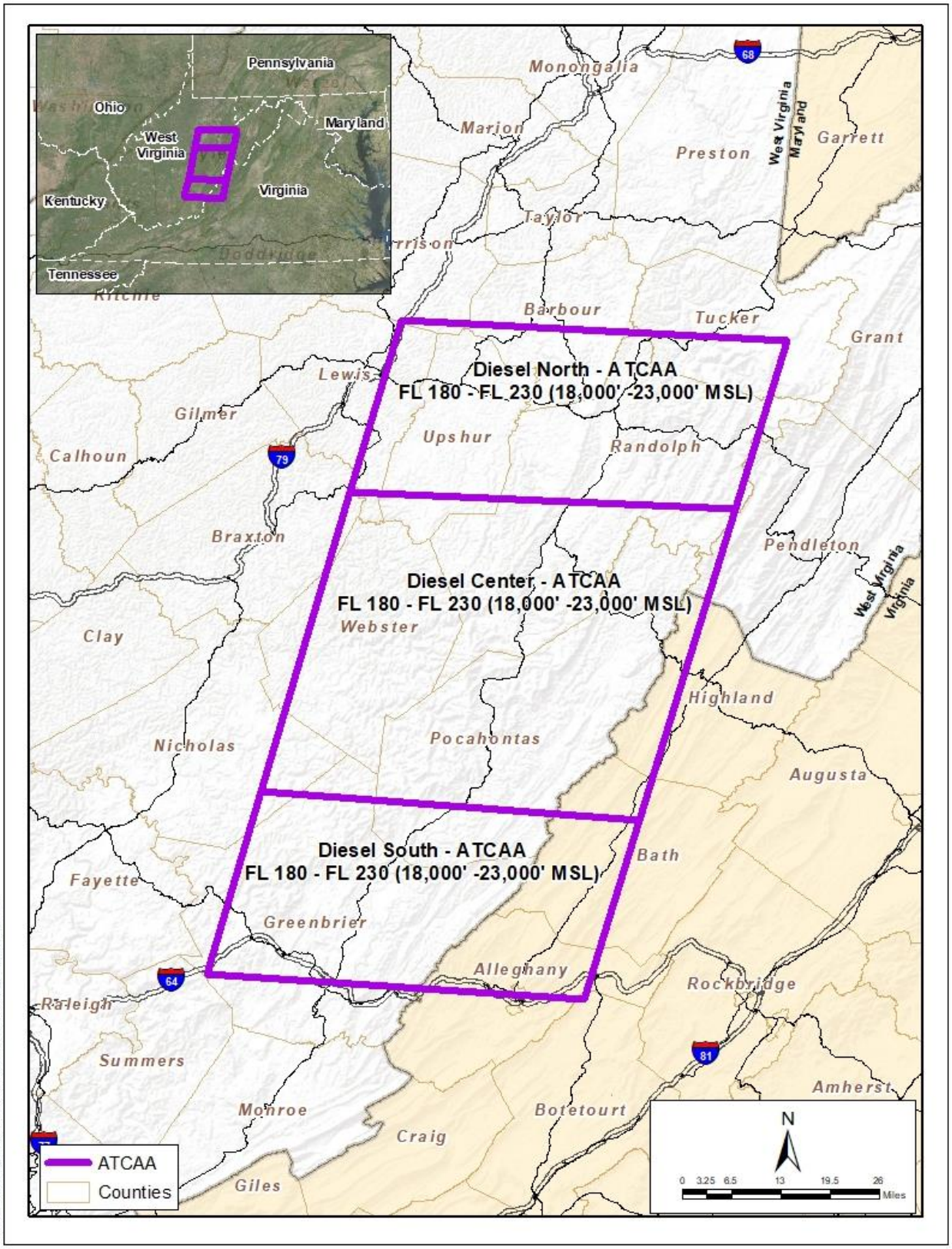


Figure 2. Proposed ATCAAs

IICEP Recipients List Environmental Assessment

West Virginia & Virginia (Evers MOA)

AGENCY		FIRST NAME	LAST NAME	TITLE	ORGANIZATION	MAILING ADDRESS	CITY	STATE	ZIP CODE	PHONE NUMBER	EMAIL ADDRESS
FEDERAL											
USFWS VA	Mr.	Troy	Anderson	Supervisor	USFWS NE Region, Virginia Field Office	6669 Short Ln	Gloucester	VA	23061	(804) 693-6694	
USFWS WV	MR.	John	Schmidt	Project Leader	United States Fish and Wildlife Service West Virginia Field Office Ecological Services	90 Vance Drive	Elkins	WV	26241	304-636-6586	john_schmidt@fws.gov
USACE				Director	West Virginia USACE	502 Eighth Street	Huntington	WV	25701-2070	304-399-5211	
US National Forests WV	Mr.	Shawn	Cochran	Forest Supervisor	US National Forest	200 Sycamore Street	Elkins	WV	23241	(304) 636-1800	
US National Forests VA	Ms	Beth	LeMaster	Forest Supervisor	US National Forest	5162 Valleypointe Parkway	Roanoke	VA	24019	540-265-5100	
U.S. Geological Service	Ms.	Pamela	Ambrose	Administrative Officer	U.S. Geological Services	12201 Sunrise Valley Dr.	Reston	VA	20192	703-648-5953	pambrose@usgs.gov
USEPA	Mr.	Cosmo	Servidio	Regional Administrato	Environmental Protection Agency	Methodist Building 1060 Chapline Street	Wheeling	WV	26003-2995	215-814-2900	R3_RA@epa.gov
National Radio Quiet Zone(NRQZ)	Ms.	Paulette	Woody	NRQZ Administrator	Green Bank Observatory	155 Observatory Road	Green Bank	WV	24944-0002	304-456-2107	nrqz@nrao.edu
STATE											
Dept. of Environmental Quality				Director	Dept. of Environmental Protection	601 57th Street SE	Charleston	WV	25304	304-926-0440	
SHPO (WV) - **Certified Mail**	Mr.	Randall	Reid-Smith	State Historic Preservation Officer	Historic Preservation Office	1900 Kanawha Blvd East	Charleston	WV	25305-0300	304-558-0220	Susan.M.Pierce@wv.gov
SHPO (VA) - **Certified Mail**	Ms.	Julie	Langan	State Historic Preservation Officer	Dept. of Historic Resources	2801 Kensington Ave	Richmond	VA	23221	804-482-6087	julie.langan@dhr.virginia.gov
Dept. of Transportation (Aviation Division)				Director	USDOT Federal Aviation Administraton	301 Eagle Mt. Road, #133	Charleston	WV	23511	304-341-5387	
Dept. of Forestry	Mr.	Barry	Cook	State Forester/Director		7 Players Club Dr.	Charleston	WV	25311	304-558-2788	Barry.L.Cook@wv.gov
Dept. of Natural Resources & Wildlife Resources Division (WV)	Mr.	John	Schmidt	Project Leader	West Virginia Ecological Services	90 Vance Drive	Elkins	WV	26241-9475	304-636-6586	john_schmidt@fws.gov
Dept. of Natural Resources & Wildlife Resources Division (VA)				Supervisor	Virginia Ecological Services	6669 Short Lane	Gloucester	VA	23061-4410	804-693-6694	troy_anderson@fws.gov
Dept. of Agriculture		Kris	Warner	State Director	West Virginia Dept. of Agriculture	1550 Earl Core Road, Suite 101	Morgantown	WV	26505	800-295-8228	
LOCAL BY COUNTY											
Harrison											
Chamber of Commerce & Economic Development	Ms.	Kim	Drummond	Director	Harrison County Chamber of Commerce	520 Main St.	Clarksburg	WV	26301	304-624-6331	
Barbour											
Chamber of Commerce					Barbour County Commision	26 North Main Street	Philippi	WV	26416	304-457-4339	
Economic Development					Barbour County Economic Development	134 N. Main Street	Philippi	WV	26416	304-457-1225	barbourcountywveda.org
Tucker											
Chamber of Commerce					Tucker County Chamber of Commerce	410 William Ave	Davis	WV	26260	304-259-5315	tuckerchamber@canaanvalley.org
Economic Development	Mr.	Steve	Leyh	Executive Director	Tucker County Development Authority	264 E. Avenue	Thomas	WV	26292	304-614-8839	tuckercounty@gmail.com
Pendleton											
Chamber of Commerce	Ms.	Laura	Brown	Executive Director	Pendleton County Chamber of Commerce	47 Maple Avenue	Franklin	WV	26807	304-358-3884	pencowv@sksrt.net
Economic Development					Pendleton County Economic and Community Development Authority	P.O. Box 602	Franklin	WV	26807	304-358-2074	eda@pendletoncounty.com
Lewis											
Chamber of Commerce					Lewis County Chamber of Commerce	115 East 2nd Street	Weston	WV	26452	304-269-2608	
Economic Development					Lewis County Economic Development	110 Center Ave, 2nd Floor	Weston	WV	26452	304-269-4993	lceda@lewiscountywv.org
Upshur											
Chamber of Commerce	Ms.	Tammy	Reger	Director	Buckhannon-Upshur Chamber of Commerce	14 East Main Street	Buckhannon	WV	26201	304-472-1722	info@gbuchamber.com
Economic Development	Mr.	Robert	Hinton	Executive Director	Upshur County Development Authority	30 E. Main Street	Budkhannon	WV	26201	304-472-1757	rob@upshurda.com
Randolph											

Chamber of Commerce	Ms.	Lisa	Messinger Wood	Executive Director	Elkins-Randolph County Chamber	10 Eleventh Street	Elkins	WV	26241	304-636-2717	chamber@erccc.com
Economic Development				Director	Randolph Development Authority	10 Eleventh Street	Elkins	WV	26241	304-637-0803	info@randolphwv.com
Highland (VA)											
Chamber of Commerce				Director	Highland County Chamber of Commerce	P.O. Box 223	Monterey	VA	24465	540-468-2550	
Economic Development	Ms.	Betty	Mitchell	Executive Director	The Highland Center of Economic Development	61 Highland Center Drive	Monterey	VA	24465	540-468-4922	highlandcenterinfo@htcnet.org
Braxton											
Chamber of Commerce					Summersville Area Chamber of Commerce	19 Memorial Park Rd	Summersville	WV	26651	304-872-1588	
Economic Development	Mr.	Richard	Jarvis	Director	Braxton County Development Authority	250 Skidmore Lane	Sutton	WV	26601	304-765-5900	
Webster											
Chamber of Commerce	Ms.	Nicole	Dudley	Director	Richwood Area Chamber of Commerce	38 Edgewood Avenue	Richwood	WV	26261	304-846-6790	rwdchamber@frontier.com
Economic Development				Director	Webster County Economic Development Authority	P.O. Box 4	Webster Springs	WV	26288	304-847-2145	wcda@websterwv.com
Pocahontas											
Chamber of Commerce & Economic Development				Director	Marlinton West Virginia Chamber of Commerce	P.O. Box 272	Marlinton	WV	24954	304-799-4048	
Alleghany (VA)											
Chamber of Commerce				Director	Clifton Forge Virginia Chamber of Commerce	501 East Ridgeway St.	Clifton Forge	VA	24422	540-862-4969	
Economic Development	Mr.	David	Nedved	Director	Allegany County Dept. of Economic Community Development	701 Kelly Road	Cumberland	MD	21502	301-777-5967	dnedved@alleganygov.org
Nicholas											
Chamber of Commerce				Director	Richwood Chamber of Commerce	One East Main Street	Richwood	WV	26261	304-846-6790	
Economic Development				Director	New River Gorge Regional Development Authority	116 N. Heber Street	Beckley	WV	25801	304-254-8115	info@NRGRDA.org
Greenbrier											
Chamber of Commerce				Director	Greater Greenbrier Chamber	200 W. Washington Street	Lewisburg	WV	24901	304-645-2818	
Economic Development				Director	Greenbrier Valley Partnership	804 Industrial Park, Suite 5	Maxwelton	WV	24957	304-497-4	info@gvedc.com
Bath (VA)											
Chamber of Commerce				Director	County of Bath Chamber of Commerce	2696 Main Street	Hot Springs	VA	24445	540-839-5409	
Borteourt (VA)											
Chamber of Commerce				Director	Botetourt Country Chamber	13 West Main Street	Fincastle	VA	24090	540-473-8280	
Economic Development				Director	Botetourt County Economic Development	One W. Main Street	Fnicastle	VA	24090	540-473-8233	
TRIBES (Certified Mail)											
Delaware Tribe		Chester	Brooks	Chief	Eastern Oklahoma	5100 Tuxedo Blvd.	Bartlesville	OK	74006-2838	(918) 337-6590	cbrooks@delawaretribe.org
Delaware Nation		Deborah	Dotson	President	Southern Plains	P.O. Box 825	Anadarko	OK	73005	(405) 247-2448	ddotson@delawarenation.com
Cherokee Nation		Bill John	Baker	Principal Chief	Eastern Oklahoma	P.O. Box 948	Tahlequah	OK	74465	(918) 456-0671	bill-baker@cherokee.org
United Keetoowah Band of Cherokee Indians		Joe	Bunch	Chief	Eastern Oklahoma	P.O. Box 746	Tahlequah	OK	74465	(918) 871-2800	jbunch@ukb-nsn.gov
Seneca Nation of Indians		Rickey	Arstrong, Sr.	President	Eastern	90 Ohi:Yo' Way	Salamanca	NY	14779	(716) 945-1790	Charisse.ground@sni.org
Seneca-Cayuga Nation (formerly Tribe of Oklahoma)		William	Fisher	Chief	Eastern Oklahoma	23701 South 655 Road	Grove	OK	74344	(918) 787-5452	wfisher@sctribe.com
Tuscarora Nation		Leo	Henry	Chief	Eastern	2006 Mt. Hope Road	Lewistown	NY	14092	(716) 601-4737	
Chickahominy Indian Tribe	Mr.	Stephen	Adkins	Chief	Chickahominy Indian Tribe	7240 Adkins Road	Charles City	VA	23030	804-652-4701	info@charlescity.org
Chickahominy Indians	Mr.	Gene	Adkins	Chief	Chickahominy Indians - Eastern Division	3120 Mount Pleasant Road	Providence Forge	VA	23140	804-966-7815	
Monacan Indian Nation	Mr.	Dan	Branham	Chief	Monacan Indian Nation	104 Walnut Place	Lynchburg	VA	24502	434-946-0389	
Nansemond Indian Tribe	Mr.	Lee	Lockamy	Chief	Nansemond Indian Tribe	5005 Mosby Road	Virginia Beach	VA	23455		

Rappahannock Tribe	Ms.	Anne	Richardson	Chief	Rappahannock Tribe	5036 Indian Neck Road	Indian Neck	VA	23148	804-769-0260	info@rappahannocktribe.org
Upper Mattaponi Indian Tribe	Mr.	Frank	Adams	Chief	Upper Mattaponi Indian Tribe	P.O. Box 184	King William	VA	23086	804-769-0041	info@umitribe.org
Airports											
Elkins-Randolph Co (EKN)	Ms.	Mary	Ricottilli	Airport Manager	Elkins-Randolph Cty Airport Authority	400 Airport Rd	Elkins	WV	26241	304-636-2726	
Upshur Co Regional (W22)	Mr.	James	Wilt	Airport Manager	Bunkhannon-Upshor Airport Authority	630 Airport Rd, Box 1042	Bunkhannon	WV	26201	304-472-9437	
Greenbrier Valley (LWB)	Mr.	Stephen	Snyder	Airport Manager	Greenbrier Cty Airport Authority	584 Airport Rd, Box 1	Lewisburg	WV	24901	304-645-3961	
Ingalls Field (HSP)	Mr.	Eric	Thompson	Airport Manager	Bath Cty Airport Authority	6240 Airport Rd	Hot Springs	WV	24445	540-839-5326	
Deer Creek Farm (WV00)	Mr.	Phillip	Doolittle	Airport Manager	(privately owned airport)	199 Green Bank Rd	Arbovale	WV	24915	304-456-4827	
Hannah Field (7VA9)	Mr.	Rob	Nicholson	Airport Manager	(privately owned airport)	1317 N. Bay Shore Dr	Virginia Beach	VA	23451	757-621-1224	kingofused@aol.com
Singleton (97VA)	Mr/Mrs	John&Cathy	Singleton	Airport Manager	(privately owned airport)	PO Box 116	Warm Springs	VA	24484	703-839-5009	
Green Bank Observatory (WV52)	Mr.	Michael	Holstine	Airport Manager	(privately owned airport)	PO Box 2	Green Bank	WV	24944	304-456-2011	
Special Interest Groups											
AOPA	Mr.	Rune	Duke	Sr Director	Aircraft Owners & Pilots Association	50 F St. NW, Ste 750	Washington	DC	20001	202-737-7950	rune.duke@aopa.org
Green Bank Observatory (NRQZ)	Ms.	Paulette	Woody	NRQZ Administrator	Green Bank Observatory	155 Observatory Rd, PO Box 2	Green Bank	WV	24944	304-456-2107	pwoody@nrao.edu
NBAA	Ms.	Hedi	Williams	Director	National Business Aviation Association	1200 G St. NW, Ste 1100	Washington	DC	20005	202-783-9255	hwilliams@nbaa.org

WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

July 15, 2019

Ms. Jennifer Harty
Cultural Resources Program Manager
Air National Guard
3501 Fetchet Avenue
Joint Base Andrews, District of Columbia 20762-5157

RE: 113th Wing of the District of Columbia Air National Guard
FR# 19-1166-Multi

Dear Ms. Harty:
We have reviewed the above mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to submitted information, the 113th Wing of the District of Columbia Air National Guard proposes to modify and add Every Military Operations Airspace over Barbour, Tucker, Grant, Upshur, Randolph, Webster, Pocahontas, Pendleton, and Greenbrier Counties in West Virginia. There will be no supersonic flights in the airspace and no ground disturbances.

Architectural Resources:
We have reviewed the submitted information and determined there are numerous properties considered eligible and listed on the National Register of Historic Places. There are also many properties that have yet to be evaluated for their eligibility to the National Register of Historic Places. However, we concur that the proposed use of the air space will not be an adverse effect on these resources. No further consultation is necessary regarding architectural resources; however, we do ask that you contact our office if your project should change or the event of an accident where cultural resources could be impacted.

We appreciate the opportunity to be of service. If you have questions regarding our comments or the Section 106 process, please contact Ernest Blevins, Structural Historian, at (304) 558-0240.

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/EEB

COMMONWEALTH of VIRGINIA

Department of Historic Resources

Matt Strickler
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

MEMORANDUM

DATE: 1 July 2019 **DHR File #** 2019-0428

TO: Ms Jennifer L. Harty
National Guard Bureau

FROM: Marc E. Holma, Architectural Historian (804) 482-6090
Office of Review and Compliance

PROJECT: Training requirements of 113th Wing of DC Air National Guard
Joint Base Andrews

___ This project will have an effect on historic resources. Based on the information provided, the effect will not be adverse.

____ This project will have an adverse effect on historic properties. Further consultation with DHR is needed under Section 106 of the NHPA.

___ Additional information is needed before we will be able to determine the effect of the project on historic resources. **Please see below.**

__X__ No further identification efforts are warranted. No historic properties will be affected by the project. Should unidentified historic properties be discovered during implementation of the project, please notify DHR.

____ We have previously reviewed this project. Attached is a copy of our correspondence.

___ Other (Please see comments below)

COMMENTS:

Administrative Services
10 Courthouse Ave.
Petersburg, VA 23803
Tel: (804) 862-6408
Fax: (804) 862-6196

Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7029
Fax: (540) 868-7033

USDA

United States Department of Agriculture

June 21, 2019

National Guard Bureau
Attention: Ramón E. Ortiz, P.E.
3501 Fetchet Avenue
Joint Base Andrews, MD 20762

RE: BNGB/A4AM – Plans and Requirements
Environmental Assessment
Plans and Requirements Review

Dear Mr. Ortiz:

After reviewing the letter you provided us dated June 13, 2019, USDA – Rural Development has no objection to the description of the Proposed Action for Modification and Addition of Evers Operations Project.

If you should have any questions, contact Harry Taylor of this office at 304-284-4887.

Sincerely,

Kris Warner
State Director

West Virginia State Office
1550 Earl Core Road, Suite 101, Morgantown, West Virginia 26505
Voice 304.284.4860 Fax 855.859.1835
USDA is an equal opportunity provider and employer.

GREEN BANK
OBSERVATORY

2 July 2019

Ramon E. Ortiz
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Re: Green Bank Observatory Comments –
Evers MOA modification, expansion and utilization

Dear Mr. Ortiz,

The Green Bank Observatory (GBO) in Green Bank, WV is the origin site of the National Radio Astronomy Observatory (NRAO) and was formed in 1957 for the purpose of astronomical observations into the radio universe. The GBO operates and maintains several large, extremely sensitive radio telescopes for the purpose of collecting astronomical radio wavelength emissions for the study of the universe. In order to minimize harmful interference at the NRAO, Pocahontas County, WV and at the Naval Radio Research Observatory (NRRO), Sugar Grove, Pendleton County, WV, the Federal Communications Commission (FCC) re: Docket No. 11745, along with the National Telecommunications and Information Agency (NTIA), and through agreement with the Interdepartment Radio Advisory Committee (IRAC), created the National Radio Quiet Zone. This zone provides a unique area bounded by 39° 15' on the north, 78° 30' W on the east, 37° 30' N on the south and 80° 30' W on the west that provides for sensitive astronomical observations by NRAO and NRRO. An example of such observation is our collection of data for the Hyugens lander on Titan, a moon of Saturn, with a transponder power equivalent of a single cellphone.

While GBO understands the reasoning behind the expansion of the Evers MOA, especially for refueling of aircraft, the protection of our airspace for the collection of extremely weak astronomical signals must be maintained. The Robert C. Byrd Green Bank Telescope (GBT), for example, operates at frequencies between 200MHz and 116GHz, with a collecting sensitivity of 10^{-32} watts/sq.meter/Hz. Additionally, it is the largest fully-steerable telescope in the world, standing at maximum height 485' AGL. Evers Low MOA would place flights above this telescope at only 500' above its highest point.

There are at least two considerations in the effect of this flight scenario. The first deals with focused noise at the feed location of the structure and the safety of our workforce. Multiplication of the noise levels due to the accumulated reflection of sound waves by the 2.3 acre collecting area could cause substantial danger to employees working on the structure, both in terms of potential physical damage to their hearing and sudden fall potential due to

unanticipated atmospheric and structural disturbance. The second deals with unknown frequency and power level radio transmissions, from unplanned directions. Due to the sensitivity of the electronic components of the telescope receivers, unwanted transmissions above certain power levels have the potential to overload and destroy the components. Both considerations noted have greater threat of impact as distance to the telescope decreases. Our sister telescope facility near Socorro, NM (telescopes of much smaller collecting area) has maintained a "gentlemen's" agreement with the U.S. Air Force for just such reasons.

Present operation of the Evers MOA through the Greenbrier River Valley to the west of the GBO has been mostly successful, however past operations have largely been accomplished at low level flight over the river valley providing mountainous protection between the telescopes and the aircraft. As we maintain operations on additional telescopes on site besides the GBT, distance requirements from mission flights to each of them would be difficult and unreasonable.

It is, therefore, the suggestion/comment/request of the GBO and NRAO that a "no-fly" zone be created around the GBO facility at a distance of 3 miles in radius from the center of the GBT. This zone would protect the operation of the GBO from spurious radio noise that would affect astronomical observations and would also serve to protect our employees from potential physical harm during routine operation and maintenance of the telescopes. We understand and acknowledge that the two existing private, local airstrips and their associated flight paths included within this zone would necessarily be excluded from the zone.

Additionally, we suggest that any activity within the Evers MOA include notification to the GBO as to date, time, type of aircraft and frequencies utilized prior to mission so that we can attempt to actively avoid potential interference and/or log the activity.

Thank you for your consideration of this request. We look forward to working with you jointly for the mutual mission success of our organizations. Should you have any questions regarding this request please do not hesitate to contact me at 304-456-2231 or by email at mholstin@nrao.edu or michaelholstine@gbobservatory.org .

Sincerely,

Michael J. Holstine, P.E.
Business Manager

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS 20762-5157

22 August 2019

Mr. Ramón E. Ortiz, P.E.
Environmental Engineer/Program Manager
Air National Guard Readiness Center
3501 Fetchet Avenue
Joint Base Andrews, MD 20762

Mr. Michael J. Holstine, P.E.
Business Manager
The Green Bank Observatory
P.O. Box 2
Green Bank, WV 24944

Dear Mr. Holstine,

Thank you for the opportunity to discuss the Green Bank Observatory, (GBO) airspace concerns by teleconference yesterday, 21 August 2019 with National Guard Bureau, (NGB) staff members and myself. I found the conversation to be both valuable and clarifying.

In addressing those concerns outlined in the GBO 2 July 2019 reply letter to the Evers Proposed Military Operations Area, (MOA) modification and the follow-up phone conversation; the NGB representing the 113th DC Air National Guard, agrees to minimize impacts to the GBO through the following accommodations:

1. To minimize noise and radio interference to the GBO, the NGB will propose a chart modification to establish a no-fly zone around the GBO facility that has a radius of 2.5 statute miles and a ceiling of 2,500 feet above ground level (AGL).

2. To address notification requirements requests from GBO, the NGB will provide notification to the GBO via email and via telephone of proposed activity every Friday with the proposed flight schedule for the following week. When circumstances warrant, weather changes and/or last minute changes will be forwarded to the GBO via telephone as soon as practicable but no later than one hour prior to the change actually occurring.

3. To prohibit NGB aircraft using the Evers MOA from targeting the GBO facility intentionally with any electromagnetic pulses.

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS 20762-5157

Should you have any questions regarding this letter, please feel free to contact me by phone at 240-612-7042 or by email at ramon.e.ortiz2.civ@ mail.mil.

Sincerely

RAMÓN E. ORTIZ, GS-14, P.E.
Environmental Engineer/Program Manager

modifications of the Evers MOA. Please contact Tami Conner, Ecosystem Staff Officer, if you need additional information. She can be reached via email at tami.conner@usda.gov or phone at 304-635-4457.

Sincerely,

SHAWN M. COCHRAN
Forest Supervisor

cc: Tami Conner, Karen Stevens

The Delaware Nation
Historic Preservation Department
31064 State Highway 281
Anadarko, OK 73005
Phone (405)247-2448

July 9, 2019

To Whom It May Concern:

The Delaware Nation Historic Preservation Department received correspondence regarding the following referenced project(s).

Project: Modification and Addition of Airspace Utilization Evers Military Operations Airspace

Our office is committed to protecting tribal heritage, culture and religion with particular concern for archaeological sites potentially containing burials and associated funerary objects.

The Lenape people occupied the area indicated in your letter during prior to European contact until their eventual removal to our present locations. According to our files, the location of the proposed project does not endanger cultural, or religious sites of interest to the Delaware Nation. **Please continue with the project as planned** keeping in mind during construction should an archaeological site or artifacts inadvertently be uncovered, all construction and ground disturbing activities should immediately be halted until the appropriate state agencies, as well as this office, are notified (within 24 hours), and a proper archaeological assessment can be made.

Please note the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Band of Mohican Indians are the only Federally Recognized Delaware/Lenape entities in the United States and consultation must be made only with designated staff of these three tribes. We appreciate your cooperation in contacting the Delaware Nation Cultural Preservation Office to conduct proper Section 106 consultation. Should you have any questions, feel free to contact our offices at 405-247-2448 ext. 1403.

Erin N. Thompson

Erin Thompson
Director of Historic Preservation
Delaware Nation
31064 State Highway 281
Anadarko, OK 73005
Ph. 405-247-2448 ext. 1403
ethompson@delawarenation-nsn.gov

Appendix B Record of Non-Applicability

RECORD OF NON-APPLICABILITY
In Accordance with the Clean Air Act - General Conformity Rule for the Proposed Environmental Assessment for Modification and/or Addition of Airspace Utilization of the Evers Military Operating Airspace

2 April 2020

This Record of Non-Applicability supports ANG's Environmental Assessment for Modification and/or Addition of Airspace Utilization of the Evers Military Operating Airspace. The proposed airspace would replace the existing Evers MOA and creates four MOAs (Evers North, Evers Central, Evers South [11,000ft MSL to 18,000ft MSL], and Evers Low [1,000ft AGL to 11,000ft MSL]) and three Air Traffic Control Assigned Airspaces (ATCAA) [Diesel North, Diesel Central, and Diesel South [FL180 to FL230]). ATCAA boundaries are coincidental with the proposed boundaries of Evers North, Central, and South.

General conformity under the Clean Air Act, Section 176 has been evaluated according to the requirements of 40 CFR §93, Subpart B. The requirements of this rule are not applicable to the Proposed Action because:

> Activities would occur within areas designated full attainment for the National Ambient Air Quality Standards, and partially include emissions that were clearly *de minimis*, such as emissions from aircraft operations above the mixing height of 3,000 ft AGL (i.e. the height above which air emissions do not directly affect individuals on the ground.) (40 CFR §93.153 (c) (xxii)).

Supported documentation and emission estimates:

( ) Are Attached
( ) Appear in the NEPA Documentation
(X) Other (Not Necessary)

Appendix C Aeronautical Proposal

FAAO 7400.2J Section 3. SUA PROPOSALS

21-3-3. PROPOSAL CONTENT

a. Proponent's Transmittal Letter. See proceeding**.**

b. Area Description.

Evers MOA, WV - Rescind

Evers Low MOA, WV

Boundaries.	Beginning	at lat. 38°38'51"N, long. 79°34'41"W; to lat. 38°24'00"N, long. 79°38'44"W; to lat. 38°08'13"N, long. 79°43'13"W; to lat. 38°10'49"N, long. 80°25'30"W; to lat. 38°38'51"N, long. 80°00'00"W; to the point of beginning.
Altitudes.		1,000 feet AGL up to but not including 11,000 feet MSL
Times of use.		Sunrise to Sunset, Daily; other times by NOTAM
Expected usage.		2 hours per day; 260 days per year
Controlling agency.		FAA, Washington, D.C. ARTCC
Using agency.		D.C. Air National Guard, 113th Wing, JB Andrews, MD

Evers East MOA, WV

Boundaries.	Beginning	at lat. 38°38'51"N, long. 79°34'41"W; to lat. 38°38'51"N, long. 79°19'49"W; to lat. 38°24'00"N, long. 79°19'49"W; to lat. 38°24'00"N, long. 79°38'44"W; to the point of beginning.
Altitudes.		1,000 feet AGL up to but not including FL180
Times of use.		Sunrise to Sunset, Daily; other times by NOTAM

Expected usage. 2 hours per day; 260 days per year

Controlling agency. FAA, Washington, D.C. ARTCC

Using agency. D.C. Air National Guard, 113th Wing, JB Andrews, MD

Evers North MOA, WV

Boundaries. Beginning at lat. 38°08'13"N, long. 79°43'13"W; to lat. 37°46'49"N, long. 79°49'14"W; to lat. 37°49'51"N, long. 80°44'02"W; to lat. 38°11'36"N, long. 80°38'15"W; to the point of beginning.

Altitudes. 11,000 feet MSL up to but not including FL180

Times of use. Sunrise to Sunset, Daily; other times by NOTAM

Expected usage. 2 hours per day; 260 days per year

Controlling agency. FAA, Washington, D.C. ARTCC

Using agency. D.C. Air National Guard, 113th Wing, JB Andrews, MD

Evers Center MOA, WV

Boundaries. Beginning at lat. 38°45'14"N, long. 79°32'49"W; to lat. 38°08'13"N, long. 79°43'13"W; to lat. 38°11'36"N, long. 80°38'15"W; to lat. 38°47'14"N, long. 80°28'50"W; to the point of beginning.

Altitudes. **1**1,000 feet MSL up to but not including FL180.

Times of use. Sunrise to Sunset, Daily; other times by NOTAM

Expected usage. 2 hours per day; 260 days per year

Controlling agency.		FAA, Washington, D.C. ARTCC
Using agency.		D.C. Air National Guard, 113th Wing, JB Andrews, MD

Evers South MOA, WV

Boundaries.	Beginning	at lat. 39°05'19"N, long. 79°27'09"W; to lat. 38°45'14"N, long. 79°32'49"W; to lat. 38°47'14"N, long. 80°28'50"W; to lat. 39°07'42"N, long. 80°23'25"W; to the point of beginning.
Altitudes.		11,000 feet MSL up to but not including FL180
Times of use.		Sunrise to Sunset, Daily; other times by NOTAM
Expected usage.		2 hours per day; 260 days per year
Controlling agency.		FAA, Washington, D.C. ARTCC
Using agency.		D.C. Air National Guard, 113th Wing, JB Andrews, MD

c. Airspace Statement of Need and Justification.

1. Describe the purpose and need for the proposed airspace.

Modify the existing Evers MOA by expanding laterally to the North, South, and West, in addition to creating three Air Traffic Control Assigned Airspaces (ATCAAs) to meet military training needs and maximize efficient use of the airspace structure. This proposed action would provide a marked improvement by increasing the size of the training airspace necessary to meet the changing needs and evolutionary requirements of air-to-air combat, air-to-ground combat, and platform technology.

The primary drivers of airspace shape, size, and feature requirements are the F-16C Block 30 Ready Aircrew Program (RAP) Tasking Memorandum, in conjunction with AFI 11-2F-16V1 that outlines the continuing training program for ACC units. These requirements define the minimum number and type of annual sorties, simulator missions and specific training events specialized aircrews must accomplish to sustain Combat Mission Readiness (CMR). Per AFI 11-2F-16V1, an effective RAP mission requires accomplishment of a complete tactical scenario or a basic skills mission.

The 113 WG maintains 30 CMR F-16C pilots, requiring a combined 1,000 overland sorties to meet annual RAP requirements. The training environment must enable effective and accurate simulation several F-16C mission sets, to include Defensive Counter Air (DCA), Offensive Counter Air – Attack Operations (OCA-AO) Combat Search and Rescue (CSAR), Close Air Support (CAS), Forward Air Control (FAC-A), and Air Interdiction (AI). Considering a notional air-to-air intercept timeline of the F-16C and realistic surface attack/close air support scenario, 80 nautical mile (NM) x 40 NM represents the minimum lateral airspace required to effectively train for Basic Fighter Maneuvering (BFM), Aerospace Control Alert (ACA), Tactical Intercepts (TI), and Air Combat Maneuvering (ACM). This is over twice the lateral area of the current Evers MOA, which is 30 NM x 16 NM. Moreover, due to the F-16C's air-to-ground utility, low altitude (LOWAT) airspace is essential for maintaining currency and proficiency to execute safe and effective combat operations, including OCA-AO, Basic Surface Attack (BSA), CAS, FAC/A. These surface attack missions represent 45% of all 113th Wing RAP sorties.

113th Wing RAP reporting from CY2017 demonstrates the negative impacts of "over land" training airspace non-availability and its weakening effect on pilot combat mission readiness. This report details that over 70% of aircrew assigned (21 of 30 pilots) were unable to meet the RAP required training for OCA-AO due to local airspace availability. The impact of this RAP deficiency was determined to be SEVERE and directly impacting the 113th Wing's ability to deploy and attack the enemy in a near peer engagement. Equally troubling was the Inertial Aided Munitions / Laser Guided Bomb Delivery (IAMS/LGB) events, with 0% of required training accomplished due to lack of available "over land" airspace.

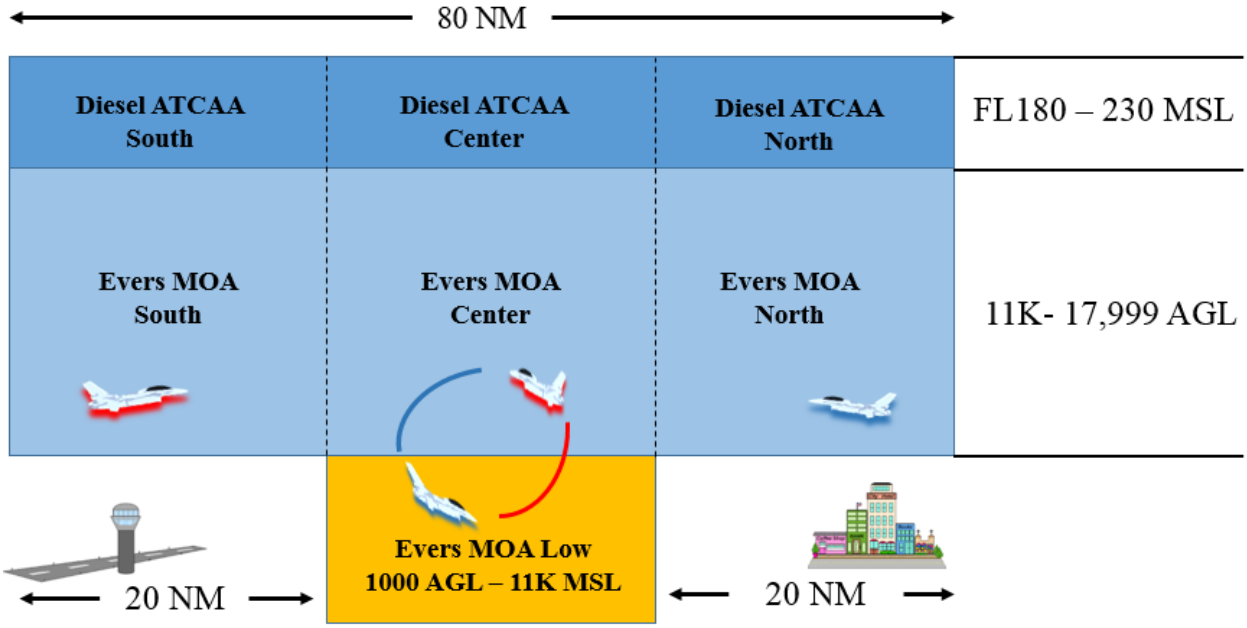
Additionally, the current configuration of the Evers MOA is too small for air-to-air refueling (AAR) operations. Regular and predictable AAR operations has become a critical training multiplier as the F-16C fleet grows older and less healthy. The Evers MOA expansion conceives an organic ARCT track that would effectively double the training opportunities of every fighter in the MOA.

The creation of three ATCAAs over the proposed MOA expansion would provide a vertical airspace that creates opportunities for full-spectrum, doctrinally driven, tactical training. The 113 WG requires access to airspace that provides a spatially viable combat training environment to qualify and maintain aircrew capabilities, preserve readiness, and ultimately achieve our national objectives. Failure to create the minimum lateral airspace for 113th WG missions will result in training shortfalls and negatively impact combat readiness and pilot safety.

PROPOSED ACTION

Laterally and vertically expand the existing Evers MOA, and segregate it into Evers Low, Evers East, Evers North, Evers Center, and Evers South MOAs. Additionally, create three ATCAAs directly over the Evers North, Center, and South MOAs, and

name these ATCAAs Diesel North, Diesel Center, and Diesel South.



Aeronautical impact: Participation with Washington, D.C. ARTCC was instrumental in designing the proposed changes to Evers MOA. The MOA was de-conflicted with Standard Terminal Arrivals (STARs), Victor Routes, and approach corridors for underlying airports. Additionally, all proposed airspace falls within the scope of a single Washington, D.C. ARTCC sector, enabling single frequency communications. In the event that the EVERS MOA airspace will be needed by ARTCC, a Letter of Agreement with Washington, D.C. ARTCC will specify options the controllers can use to curtail military operations in order to allow joint use of the airspace.

2. Joint use. The Airspace will be available for joint use. The FAA joint-use policy per FAAO 7400.2J para 21-1-8 will be recognized. A Letter of Agreement with Washington, D.C. ARTCC will outline procedures for scheduling, activating, and de-activating the airspace.

d. Air Traffic Control Assigned Airspace (ATCAA). Yes, the proposal includes expanding the airspace to include 3 ATCAAs.

Diesel North ATCAA, WV

Boundaries. Beginning at lat. 38°08'13"N, long. 79°43'13"W; to lat. 37°46'49"N, long. 79°49'14"W; to lat. 37°49'51"N, long. 80°44'02"W; to lat. 38°11'36"N, long. 80°38'15"W; to the point of beginning.

Altitudes. FL180 to FL230

Times of use. Sunrise to Sunset, Daily; other times by NOTAM

Expected usage. 2 hours per day; 260 days per year

Controlling agency. FAA, Washington, D.C. ARTCC

Using agency. D.C. Air National Guard, 113th Wing, JB Andrews, MD

Diesel Center ATCAA, WV

Boundaries. Beginning at lat. 38°45'14"N, long. 79°32'49"W;
to lat. 38°08'13"N, long. 79°43'13"W;
to lat. 38°11'36"N, long. 80°38'15"W;
to lat. 38°47'14"N, long. 80°28'50"W;
to the point of beginning.

Altitudes. FL180 to FL230

Times of use. Sunrise to Sunset, Daily; other times by NOTAM

Expected usage. 2 hours per day; 260 days per year

Controlling agency. FAA, Washington, D.C. ARTCC

Using agency. D.C. Air National Guard, 113th Wing, JB Andrews, MD

Diesel South ATCAA, WV

Boundaries. Beginning at lat. 39°05'19"N, long. 79°27'09"W;
to lat. 38°45'14"N, long. 79°32'49"W;
to lat. 38°47'14"N, long. 80°28'50"W;
to lat. 39°07'42"N, long. 80°23'25"W;
to the point of beginning.

Altitudes. FL180 to FL230

Times of use. Sunrise to Sunset, Daily; other times by NOTAM

Expected usage. 2 hours per day; 260 days per year

Controlling agency. FAA, Washington, D.C. ARTCC

Using agency. D.C. Air National Guard, 113th Wing, JB Andrews, MD

e. Activities.

1. For areas that will contain aircraft operations.

(a) Average number and types of aircraft that will use the area.

F-16C:	3 aircraft, 2 sorties per day, 10 days per month
A-10C:	2 aircraft, 1 sortie per day, 3 days per month
F-22:	3 aircraft, 1 sortie per day, 10 days per month
T-38A:	3 aircraft, 1 sortie per day, 5 days per month
F-15E:	4 aircraft, 2 sorties per day, 12 days per month
C-17:	1 aircraft, 1 sortie per day, 2 days per month
C-130:	2 aircraft, 1 sortie per day, 4 days per month
KC-135:	1 aircraft, 1 sortie per day, 4 days per month

(b) Specific Activities and the maximum altitudes required for each type of activity planned.

Tactical combat maneuvering by fighter and transport category fixed wing aircraft involving abrupt, unpredictable changes in altitude, attitude, and direction of flight. Maximum altitude FL230.

Tactical Intercepts (TI). Maximum altitude FL230
Air Combat Maneuvering (ACM). Maximum altitude FL230
Basic Surface Attack (BSA). Maxinum altitude FL230
Offensive Counter Air (OCA-AO). Maximum altitude FL230
Air Combat Tactics (ACT). Maximum altitude FL230
Non-standard formation flights. Maximum altitude FL230
Close Air Support (CAS). Maximum altitude FL230
Surface Attack Tactics (SAT). Maximum altitude FL230

Forward Airstrike Control – Airborne (FAC-A). Maximum altitude FL230
Combat Search and Rescue (CSAR). Maximum altitude FL230
Air Interdiction (AI). Maximum altitude FL230
Opposed Surface Attack Tactics (OPSAT). Maximum altitude FL230
Defensive Counter Air (DCA). Maximum altitude FL230

Large Force Employment (LFE) combat training. Maximum altitude FL230 Basic Fighter Maneuvering (BFM). Maximum altitude FL230 Air-to-air Refueling. Maximum altitude FL230

(c) Supersonic Flight. N/A. Supersonic flight operations will be prohibited in the proposed airspace.

(d) Firing, Ordnance Delivery Runs, and Weapons Impact areas. N/A. Weapons, Chaff, Flairs and Ordnance will not be used in EVERS MOA or DIESEL ATCAA.

2. Surface-to-surface or surface-to-air weapons firing. N/A.

f. Environmental and land use information.

1. Mr. Ben Mains
113th Environmental Protection Specialist
benjamin.r.mains.nfg@mail.mil
(240) 857-0434

2. 113th Wing agrees to provide reasonable and timely aerial access to the underlying public and private land. This access will be coordinated via a proposed direct communication line with the 113th Wing Airfield Management Office.

3. Not applicable.

g. Communications and Radar.

1. Ground based radar and radio communications will be used by Washington, D.C. ARTCC to monitor the airspace.

2. N/A.

h. Safety considerations.

1. Activity will be contained within the MOA using geographic references, inertial navigation, global positioning systems and TACAN radial/DME references. In addition, the 113th Wing uses a Situational Awareness DATA Link (SADL) display in which airspace boundaries are depicted and area borders easily defined.

2. Malfunctions will be handled in accordance with aircraft technical orders, Service Directives, and FARs.

3. The employment of ordnance, flares, and chaff will not be authorized.

4. Eye-safe laser operations will be conducted within boundaries of the EVERS MOAs. The training laser beam does not actually emit energy and will not penetrate outside approved DoD boundaries.

i. Coordination summary.

National Guard Bureau/A3/3/6/10TA, Mr. Jamie Flanders, Airspace Manager
Washington, D.C. ARTCC, Mr. Thomas Hall, Air Traffic Control
Washington, D.C. ARTCC, Mr. Dan Glancey, Airspace & Procedures
JB Andrews, MSgt Sheila King, Airspace Manager
AFREP, Lt Col Vilachack Ladara
ATREP, Mr. Derreck Boring

j. Area Chart

k. Environmental Documents. All applicable environmental documents will be provided separately.

l. Graphic Notice Information. N / A

m. Other

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Appendix D Eastern Region Forester Sensitive Species

2019 Eastern Region Forester Sensitive Species List - Monongahela National Forest

Species	Common Name
Mammals	
Glaucomys sabrinus fuscus	WV Northern Flying Squirrel
Microtus chrotorrhinus carolinensis	Southern Rock Vole
Myotis leibii	Eastern Small-footed Myotis
Myotis lucifugus	Little Brown Myotis
Neotoma magister	Allegheny Woodrat
Perimyotis subflavus	Tri-colored Bat
Sorex dispar	Long-tailed Shrew
Sorex palustris punctulatus	Southern Water Shrew
Spilogale putorius	Eastern Spotted Skunk
Sylvilagus obscurus	Appalachian Cottontail
Birds	
Accipiter gentilis	Northern Goshawk
Ammodramus henslowii	Henslow's Sparrow
Asio otus	Long-eared Owl
Contopus cooperi	Olive-sided Flycatcher
Falco peregrinus anatum	American Peregrine Falcon
Haliaeetus leucocephalus	Bald Eagle
Lanius ludovicianus migrans	Migrant Loggerhead Shrike
Melanerpes erythrocephalus	Red-headed Woodpecker
Oreothlypis ruficapilla	Nashville Warbler
Parkesia noveboracensis	Northern Waterthrush
Pooecetes gramineus	Vesper Sparrow
Setophaga cerulea	Cerulean Warbler
Setophaga discolor	Prairie Warbler
Vermivora chrysoptera	Golden-winged Warbler
Reptiles	
Crotalus horridus	Timber Rattlesnake
Glyptemys insculpta	Wood Turtle
Virginia valeriae pulchra	Mountain Earth Snake
Amphibians	
Aneides aeneus	Green Salamander
Cryptobranchus alleganiensis	Eastern Hellbender
Pseudotriton montanus	Mud Salamander
Fish	
Clinostomus elongatus	Redside Dace
Etheostoma osburni	Candy Darter
Exoglossum laurae	Tonguetied Minnow
Margariscus margarita	Pearl Dace
Notropis scabriceps	New River Shiner
Pararhinichthys bowersi	Cheat Minnow
Percina gymnocephala	Appalachia Darter
Phenacobius teretulus	Kanawha Minnow
Insects	
Arrhopalites pavo	A Cave Springtail
Brachionycha borealis	Boreal Fan Moth
Calephelis borealis	Northern Metalmark
Callophrys irus	Frosted Elfin
Cicindela ancocisconensis	Appalachian Tiger Beetle
Cicindela patruela	Northern Barrens Tiger Beetle
Cicindela purpurea	Cow Path Tiger Beetle
Danaus plexippus	Monarch

Species	Common Name
Erora laeta	Early Hairstreak
Erynnis lucilius	Columbine Duskywing
Euchlaena milnei	A Geometrid Moth
Gomphus quadricolor	Rapids Clubtail
Gomphus viridifrons	Green-Faced Clubtail
Hadena ectypa	A Noctuid Moth
Hesperia metea	Cobweb Skipper
Lycaena hyllus	Bronze Copper
Pieris virginiensis	West Virginia White
Polygonia faunus smythi	Smyth's Green Comma
Pseudanophthalmus fuscus	Greenbrier Cave Beetle
Pseudanophthalmus hadenoecus	Timber Ridge Cave Beetle
Pseudanophthalmus hypertrichosis	Martha's Cave Beetle
Pseudanophthalmus montanus	Dry Fork Valley Cave Beetle
Pseudosinella certa	Gandy Creek Cave Springtail
Pseudosinella fonsa	Cave Springtail
Pseudosinella gisini	A Springtail
Pyrgus wyandot	Grizzled Skipper
Sinella agna	A Springtail
Speyeria diana	Diana Fritillary
Crustaceans	
Caecidotea cannula	Cannulate Cave Isopod
Caecidotea holsingeri	Holsinger's Cave Isopod
Caecidotea sinuncus	A Cave Isopod
Caecidotea stygia	A Cave Isopod
Cambarus elkensis	Elk River Crayfish
Rheocyclops indiana	Indiana Groundwater Copepod
Bivalves	
Alasmidonta marginata	Elktoe
Lasmigona subviridis	Green Floater
Gastropods	
Fontigens tartarea	Organ Cavesnail
Other Invertebrates	
Apochthonius paucispinosus	Dry Fork Valley Cave Pseudoscorpion
Phagocata angusta	A Cave Obligate Planarian
Pseudotremia lusciosa	Germany Valley Cave Millipede
Pseudotremia princeps	South Branch Valley Cave Millipede
Sphalloplana culveri	Culver's Planarian
Stygobromus culveri	Culver's Cave Amphipod
Stygobromus emarginatus	Greenbrier Cave Amphipod
Stygobromus franzi	Franz's Cave Amphipod
Stygobromus nanus	Pocahontas Cave Amphipod
Stygobromus parvus	Minute Cave Amphipod
Trichopetalum weyeriensis	Grand Caverns Blind Cave Millipede
Trichopetalum whitei	Luray Caverns Blind Cave Millipede
Hesperochernes mirabilis	Southeastern Cave Pseudoscorpion
Plants	
Agrostis mertensii	Northern Bentgrass
Allium allegheniense	Allegheny Onion
Allium oxyphilum	Lillydale Onion
Amelanchier bartramiana	Bartram Shadbush
Arabis patens	Spreading Rock-cress
Astragalus distortus var. distortus	Ozark Milkvetch

Species	Common Name
Astragalus neglectus	Cooper's Milkvetch
Baptisia australis var. australis	Blue Wild Indigo
Botrychium lanceolatum var. angustisegmentum	Lanceleaf Grapefern
Carex lucorum var. austrolucorum	Blue Ridge Sedge
Carex roanensis	Roan Mountain Sedge
Clematis occidentalis var. occidentalis	Western Blue Virginsbower
Corallorhiza bentleyi	Bentley's Coralroot
Cornus rugosa	Roundleaf Dogwood
Cypripedium reginae	Showy Lady's Slipper
Delphinium exaltatum	Tall Larkspur
Eriogonum alleni	Shale Barren Buckwheat
Erysimum capitatum var. capitatum	Sanddune Wallflower
Euphorbia purpurea	Darlington's Glade Spurge
Gaylussacia brachycera	Box Huckleberry
Gymnocarpium appalachianum	Appalachian Oak Fern
Hasteola suaveolens	False Indian Plantain
Heuchera alba	White Alumroot
Hexalectris spicata	Crested Coralroot
Hypericum mitchellianum	Blue Ridge St. John's-wort
Ilex collina	Long-stalk Holly
Juglans cinerea	Butternut
Juncus filiformis	Thread Rush
Juncus trifidus	Highland Rush
Liatris turgida	Turgid Blazing Star
Linnaea borealis ssp. americana	Twinflower
Linum sulcatum	Grooved Yellow Flax
Listera cordata	Heartleaf Twayblade
Marshallia grandiflora	Monongahela Barbara's-buttons
Menyanthes trifoliata	Bog Buckbean
Monarda fistulosa ssp. brevis	Smoke Hole Bergamot
Ophioglossum engelmannii	Limestone Adder's-tongue
Paronychia argyrocoma	Silvery Nailwort
Paronychia virginica	Yellow Nailwort
Paxistima canbyi	Canby's Mountain-lover
Pedicularis lanceolata	Swamp Lousewort
Phlox buckleyi	Swordleaf Phlox
Piptatheropsis canadensis	Canadian Ricegrass
Platanthera shriveri	Shriver's Purple Fringed Orchid
Poa paludigena	Bog Bluegrass
Polemonium vanbruntiae	Bog Jacob's-ladder
Potamogeton tennesseensis	Tennessee Pondweed
Pycnanthemum beadlei	Beadle's Mountainmint
Ranunculus pensylvanicus	Pennsylvania Buttercup
Rhamnus lanceolata ssp. lanceolata	Lanceleaf Buckthorn
Ribes lacustre	Bristly Black Currant
Rosa blanda var. blanda	Smooth Rose
Rubus pubescens var. pubescens	Dwarf Red Blackberry
Saxifraga michauxii	Michaux's Saxifrage
Scutellaria saxatilis	Rock Skullcap
Silene virginica var. robusta	Fire Pink
Stachys aspera	Hyssopleaf Hedgenettle
Stellaria borealis ssp. borealis	Boreal Starwort
Taenidia montana	Mountain Pimpernel

Species	Common Name
Taxus canadensis	Canada Yew
Tofieldia glutinosa	Sticky Tofieldia
Trichomanes boschianum	Bristle Fern
Trichostema setaceum	Narrow-leaved Blue-curls
Trifolium virginicum	Kate's Mountain Clover
Triphora trianthophora	Threebirds
Viburnum opulus L. var. americanum	American Cranberrybush
Viola appalachiensis	Appalachian violet
Vitis rupestris	Sand Grape
Woodwardia areolata	Netted Chainfern
Non-vascular Plants	
Tortula ammonsiana	Ammons' Tortula Moss

Documentation of Threatened, Endangered or Sensitive Species Occurrences for (PROJECT NAME)
Coding for Occurrence Analysis Results (OAR) for 199 species

Forest updated November 26, 2018 (based on Region 8 sensitive species list effective March 15, 2018)

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
VERTEBRATE										
Fish										
	-	X	*Ammocrypta clara*	Western sand darter	Clinch R, Powell R	Aquatic-rivers.	S	G3	S1	-
	-	X	*Chrosomus cumberlandensis*	Blackside dace	Upper Cumberland R, Upper Powell R, Poor Fk Cumberland R, Clinch R drainage - Staunton Ck McGhee Ck	Aquatic-streams.	T	G2	S1	S3 (KY)
	-	X	*Erimonax monachus*	Spotfin chub	Lower N Fk Holston R	Aquatic-streams.	T	G2	S1	-
	-	X	*Erimystax cahni*	Slender chub	Two sites - Powell R, Lee Co	Aquatic-rivers.	T	G1	S1	-
	-	X	*Erimystax insignis*	Blotched chub	Clinch-Powell system, S Fk Holston R	Aquatic-streams/rivers.	S	G4	S3	-
	-	X	*Etheostoma acuticeps*	Sharphead darter	S and Middle Fk Holston R	Aquatic-rivers.	S	G3	S1	-
	-	X	*Etheostoma cinereum*	Ashy Darter	Upper Clinch R, Guest R gorge	Aquatic-rivers.	S	G2G3	S1	-
	-	X	*Etheostoma osburni*	Candy darter	Big Stony Ck, Dismal Creek, Cripple Creek (New R watershed)	Aquatic-streams.	E	G3	S1	S2
	-	X	*Etheostoma percnurum*	Duskytail darter	Copper Ck, Clinch R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Etheostoma denoncourti*	Golden darter	Four sites Clinch R, lower Copper Ck.	Aquatic-rivers. Formerly: Tippecanoe darter, *Etheostoma tippecanoe.*	S	G3G4	S1	S2
	-	X	*Etheostoma vulneratum*	Wounded darter	N & S Fk Holston R, Clinch R, Powell R.	Aquatic-Rivers.	S	G3	S2S3	-
	-	X	*Icthyomyzon greeleyi*	Mountain brook lamprey	M, N Fk Holston R, Copper Ck, Indian Ck, Clinch R, Powell R	Aquatic-rivers.	S	G3G4	S2	S1
	-	X	*Notropis ariommus*	Popeye shiner	N Fk Holston R, Clinch R, Powell R	Aquatic-rivers.	S	G3	S2S3	S2
	X	X	*Notropis semperasper*	Roughhead shiner	Upper James R watershed above Buchanan (Cowpasture R, Jackson R, Craig Ck)	Aquatic-rivers.	S	G2G3	S2S3	-
	-	X	*Noturus flavipinnis*	Yellowfin madtom	Lower & Mid reaches of Copper Ck, Powell R	Aquatic-streams.	T	G1	S1	-
	X	X	*Noturus gilberti*	Orangefin madtom	S Fk Roanoke R watershed, Roanoke R above Salem, Craig Ck, Johns Ck, Cowpasture R	Aquatic-streams.	S	G2	S2	-
	-	X	*Percina burtoni*	Blotchside logperch	N Fk Holston R, Clinch R, Copper Ck, Little R	Aquatic-rivers.	S	G2G3	S1	-
	-	X	Percina rex	Roanoke logperch	Upper Roanoke R watershed	Aquatic-rivers.	E	G1G2	S1S2	-
	-	X	*Percina williamsi*	Sickle darter	S & N Fk Holston R above Saltville, Clinch R - lower Copper Ck.	Aquatic-rivers. Formerly: *Percina macrocephala*.	S	G2	S1S2	S2
	-	X	*Phenacobius teretulus*	Kanawha minnow	Upper New R watershed	Aquatic-streams.	S	G3G4	S2S3	S1
Amphibian										
	-	X	*Aneides aeneus*	Green salamander	Bland, Dickenson (Skegg Boulderfield), Lee, Russell, Scott, Tazewell, Washington, Wise, Wythe Cos VA; Greenbrier, Monroe, Pendleton Cos WV	Damp (not wet) crevices in shaded rock outcrops and ledges; beneath loose bark; in cracks of standing or fallen trees; in or under logs on ground.	S	G3G4	S3	S3
	-	X	*Cryptobranchus alleganiensis*	Hellbender	N & S Fk Holston (Whitetop Laurel), Clinch R, Copper Ck, Powell R.	Aquatic-rivers, streams.	S	G3G4	S2S3	S2
	-	X	*Desmognathus organi*	Northern pygmy salamander	Grayson, Smyth, Washington Cos. Whitetop Mt. and Mt. Rogers	Spruce-fir forests and adjacent northern hardwoods, >3600'	S	G3	S2	-
	-	X	*Plethodon hubrichti*	Peaks of Otter salamander	Peaks of Otter, Apple Orchard Mtn	Mixed oak, late successional with loose rocks and logs, >1800'.	S	G2	S2	-
	X	-	*Plethodon punctatus*	Cow Knob salamander	Shenandoah Mtn, VA & WV	Mixed oak, late successional with loose rocks and logs, >2500'.	S	G3	S2	S1
	X	-	*Plethodon sherando*	Big Levels salamander	Big Levels, Augusta Co	Forest and rocky talas slopes 1900' – 3580'.	S	G2	S2	-
	X	-	*Plethodon virginia*	Shenandoah Mountain salamander	Rockingham Co	Temperate forests between 3600' – 3900'.	S	G2G3	S2	SNR
	-	X	*Plethodon welleri*	Weller's salamander	Mt Rogers & Whitetop Mtn	Spruce-fir forests and adjacent northern hardwoods.	S	G3	S2	-
Reptile										
	X	-	*Clemmys guttata*	Spotted turtle	Maple Flats, Augusta Co	Mostly unpolluted, shallow bodies of water with a soft bottom and aquatic vegetation; small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, vernal pools, and lake margins.	S	G5	S4	S1
	X	-	*Glyptemys insculpta*	Wood turtle	Page, Rockingham, Shenandoah Cos; N Shenandoah R watershed	Along permanent streams during much of year; in summer may roam widely overland; variety of terrestrial habitats adjacent to streams, including deciduous woods, cultivated fields, and woodland bogs, marshy fields and pastures. Overwinters in streams.	S	G3	S2	S3
	X	X	*Pituophis melanoleucus*	Pinesnake	Historic records from Alleghany, Augusta, Botetourt, Craig, Rockingham Cos., VA: Monroe Co, WV. No current records known from GWJNF.	Xeric, pine-dominated or pine-oak woodland with open, low understory established on sandy soils; require forest openings, with level, well-drained sandy soils and little shrub cover as nesting/hibernation sites.	S	G4	S1?	SH
Bird										
	-	X	*Ammodramus henslowii*	Henslow's Sparrow	Pulaski Co (Radford Arsenal). No nest records known on GWJNF.	Open fields, meadows with grass interspersed with weeds or shrubby vegetation, especially in damp or low-lying areas; unmowed hayfields.	S	G4	S1B	S3B
Mammal										
	-	-	*Corynorhinus rafinesquii*	Rafinesque's big-eared bat	Has not been found in VA but has occurred nearby in WV, KY, & TN. In 1978, a large nursery colony was found in Hancock Co., TN, very close to the VA-TN border. Only possible in Lee, Scott, Washington Co.	Caves in winter, large hollow trees summer, may also use cliff-lines, buildings, and bridges in summer. Not on VADCR-NHP "Rare Animal" list.	S	G3G4	-	S1

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	X	X	*Corynorhinus townsendii virginianus*	Virginia big-eared bat	Summer: VA - Tazewell Co (3 caves), Highland Co (1 cave); WV - Pendleton Co (4 caves); Winter: Highland, Rockingham, Bland, and Tazewell Cos (6 caves); Pendleton Co (6 caves). Largest VA population in Tazewell Co and largest WV population in Pendleton Co. Small numbers of bats (usually <10) in a few other widely scattered caves during summer months. Bath & Pulaski Co records are historic. Known winter population in Church Mtn Cave, North River RD, Rockingham county.	Resides in caves winter and summer. Short distance migrant (<40 miles) between winter and summer caves. Forages primarily on moths and foraging habitat is common (fields, forests, meadows, etc.). Forages within 6 miles of summer caves. USFWS Critical Habitat is 5 caves in WV (4 Pendleton Co and 1 Tucker Co). Closest Critical Habitat cave to GWJNF is ~3 miles in Pendleton Co, WV. OAR code of "2" used when project further than 6 miles from summer or winter occupied cave.	E	G3G4T2	S1	S2
	-	X	*Glaucomys sabrinus coloratus*	Carolina northern flying squirrel	Mt Rogers & Whitetop area	Spruce-fir forests and adjacent northern hardwoods.	E	G5T2	S1	-
	X	-	*Glaucomys sabrinus fuscus*	Virginia northern flying squirrel	Laurel Fork area, Highland Co	Spruce forests and adjacent northern hardwoods.	S	G5T2	S1	S2
	-	X	*Myotis grisescens*	Gray bat	Ridge & Valley, Clinch R watershed; Russell Fk at Russell Fk/Pound R confluence.	Caves winter and summer, forages widely.	E	G3	S1	-
	X	X	*Myotis leibii*	Eastern small-footed bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in caves during winter, roosts in crevices of large rock outcrops, cliffs, and under large rocks in talus & boulder-fields during summer, plus similar man-made structures like rip-rap and bridges, forages widely in all forested and open habitat types over both ridges and valleys.	S	G1G3	S2	S1
	X	X	*Myotis septentrionalis*	Northern long-eared bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in crevices and cracks of cave walls during winter (sometimes mines & tunnels), difficult to find and rarely seen. During summer, forages widely and roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Also may roost in structures like barns, sheds, & houses. Decline due to WNS.	T	G1G2	S3	S3
	X	X	*Myotis sodalis*	Indiana bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Caves winter, upland hardwoods summer, forages widely along riparian areas and open woodlands.	E	G2	S1	S1
	X	X	*Perimyotis subflavus*	Tricolored bat	Every county in VA, WV, KY	Caves in winter: Caves, trees, cliffs, barns during summer months. Decline due to WNS. Formally: Eastern pipistrelle.	S	G3	S1S3	
INVERTEBRATE										
Snail (Mollusk, Class Gastropoda)										
	X	-	*Fontigens tartarea*	Organ cavesnail	Rock Camp Cave (1 mile from FS), McClung-Zenith Cave (1.5 mile from FS), Monroe Co, WV; Greenbrier, Pocahontas, Randolph, Tucker Cos, WV; Bath, Highland Cos, VA	Caves. Obligate troglobite.	S	G2	S1S2	S2
	-	-	*Gastrodonta fonticula*	Appalachia bellytooth	No known records on GWJ. Scott and Wise Co records need to be verified.	Damp, wooded environments, particularly in deep piles of wet leaf litter and around rotting wood debris.	S	G3G4	SU	SNR
	X	X	*Glyphyalinia raderi*	Maryland glyph	Alleghany, Montgomery Cos	Calciphile, edge of seeps within leaf litter. May burrow.	S	G2	S1S2	S2
	X	-	*Helicodiscus diadema*	Shaggy coil	Alleghany Co	Calciphile; semi-open, calcium-rich environments, especially limestone rubble/talus and thinly wooded limestone hills.	S	G1	S1	-
	X	X	*Helicodiscus triodus*	Talus coil	Alleghany, Botetourt, Rockbridge Cos	Calciphile, limestone rubble on wooded hillsides and near cave entrances.	S	G2	S1S2	SH
	-	X	*Io fluvialis*	Spiny riversnail	Clinch R, N Fk Holston R	Aquatic-rivers.	S	G2	S2	-
	-	-	*Paravitrea septadens*	Brown supercoil	Breaks Interstate Park, Dickenson Co; Buchanan Co., VA. No known records on GWJ.	Steep forested slopes and in ravines, often among woody debris, rocks, or deeper leaf litter; mixed eastern hemlock-hardwood forest, also in richer hardwood stands.	S	G1	S1	-
	-	-	*Stenotrema altispira*	Highland slitmouth	No known records on GWJ. Grayson and Smyth Co records need to be verified.	Higher elevations, in leaf litter and woody debris.	S	G3	S1	-
	-	-	*Ventridens decussatus*	Crossed dome	No known records on GWJ. Scott Co records need to be verified.	High elevations, usually >3000', in leaf litter, particularly oak leaves.	S	G3	SU	-
	-	-	*Vertigo bollesiana*	Delicate vertigo	No known records on GWJ. VA and WV records need to be verified.	Leaf litter often under shrubs, on cliff-face ledges and boulder tops in mesic upland forest, and damp microsites in northern white cedar wetlands.	S	G4	SU	-
	X	-	*Vertigo clappi*	Cupped vertigo	Greenbrier & Pendelton Cos, WV	Well-rotted, humid leaf litter and fine soil on shaded boulders, talus, ledges, and bases of forested lime-rich bedrock outcrops.	S	G1G2	SU	SNR
Mussel (Mollusk, Class Bivalvia)										
	-	X	*Alasmidonta marginata*	Elktoe	Greenbrier R & New R, WV. Upper New R; Reed Creek; Sinking Creek (Giles Co.); Wolf Creek (Bland Co.); upper S Fk Holston; historical Upper Clinch.	Aquatic-rivers.	S	G4	S1S2	S2
	X	-	*Alasmidonta varicosa*	Brook floater	Potomac drainage	Aquatic-rivers.	S	G3	S1	S1
	-	X	*Alasmidonta viridis*	Slippershell mussel	Historic in Upper Clinch R excluding Copper Creek where extant; Upper S Fk Holston	Aquatic-rivers.	S	G4G5	S1	-
	-	X	*Cumberlandia monodonta*	Spectaclecase	2 sites Clinch R	Aquatic-rivers.	E	G3	S1	-
	-	X	*Cyprogenia stegaria*	Fanshell	Lower Clinch R, Scott Co	Aquatic-rivers.	E	G1Q	S1	S1
	-	X	*Dromus dromas*	Dromedary pearlymussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
	X	X	*Elliptio lanceolata*	Yellow lance	Roanoke R, James R	Aquatic-rivers.	T	G2G3	S2S3	-
	-	X	*Epioblasma brevidens*	Cumberlandian combshell	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Epioblasma capsaeformis*	Oyster mussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Epioblasma florentina aureola*	Golden riffleshell	Restricted to lower 1.0 mile of Indian Ck to Clinch R. All other historical populations in M & Upper Tennessee R system now extirpated.	Aquatic-rivers. Formerly: tan riffleshell.	E	G1T1	S1	-
	-	X	*Epioblasma torulosa gubernaculum*	Green-blossom pearlymussel	Clinch R, N Fk Holston R	Aquatic-rivers.	E	G2TX	SX	-

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	-	X	*Epioblasma triquetra*	Snuffbox	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G3	S1	S2
	-	X	*Fusconaia cor*	Shiny pigtoe	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
	-	X	*Fusconaia cuneolus*	Fine-rayed pigtoe	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Fusconaia masoni*	Atlantic pigtoe	Roanoke R, Craig Ck drainage	Aquatic-rivers.	PT	G2	S2	-
	-	X	*Hemistena lata*	Cracking pearlymussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Lampsilis abrupta*	Pink mucket	Clinch R	Aquatic-rivers.	E	G2	SX	S1
	X	-	*Lampsilis cariosa*	Yellow lampmussel	N Fk Shenandoah R; Shenandoah, Warren Cos.	Aquatic-rivers.	S	G3G4	S2	S1
	-	X	*Lasmigona holstonia*	Tennessee heelsplitter	Upper Clinch, N and M Fk Holston R drainages; Wolf Ck, Bland Co below Burkes Garden	Aquatic-streams.	S	G3	S1	-
	X	-	*Lasmigona subviridis*	Green floater	Widely distributed in N & S Fk Shenandoah R, Pedlar R, James R	Aquatic-rivers.	S	G3	S2	S2
	-	X	*Lemiox rimosus*	Birdwing pearlymussel	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
	X	X	*Parvaspina collina*	James spinymussel	Potts Ck, Craig Ck, Johns Ck, Patterson Run, Pedlar R, Cowpasture R, Mill Ck (Deerfield)	Aquatic-rivers. Formerly: *Pleurobema collina*.	E	G1	S1	S1
	-	X	*Pegias fabula*	Little-winged pearlymussel	Clinch R, N Fk Holston R, S Fk Holston R, Little R	Aquatic-streams.	E	G1	S1	-
	-	X	*Plethobasus cyphyus*	Sheepnose	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S1
	-	X	*Pleurobema cordatum*	Ohio pigtoe	Clinch R	Aquatic-rivers.	S	G4	S1	S2
	-	X	*Pleurobema oviforme*	Tennessee clubshell	Clinch R, Powell R, N, Middle, S Fk Holston R	Aquatic-streams.	S	G2G3	S2S3	-
	-	X	*Pleurobema plenum*	Rough pigtoe	Clinch R	Aquatic-rivers.	E	G1	SH	SH
	-	X	*Pleurobema rubrum*	Pyramid pigtoe	Upper Clinch R	Aquatic-rivers.	S	G2G3	SH	-
	-	X	*Pleuronaia barnesiana*	Tennessee pigtoe	Clinch R, Powell R, N Middle, S Fk Holston R	Aquatic-rivers.	S	G2G3	S2	-
	-	X	*Pleuronaia dolabelloides*	Slabside pearlymussel	Clinch R, M Fk Holston, N Fk Holston R	Aquatic-rivers.	E	G2	S2	-
	-	X	*Ptychobranchus subtentum*	Fluted kidneyshell	Holston R., Powell R., Indian R., Clinch R., Little R., Copper Ck., Big Moccasin Ck. Critical Habitat: Indian Ck, VA: M Fk Holston R. VA: Big Moccasin Ck., VA: Copper Ck., VA; Clinch R, TN, VA: Powell R., TN, VA	Aquatic-rivers.	E	G2	S2	-
	-	X	*Quadrula cylindrica strigillata*	Rough rabbits foot	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-streams.	E	G3G4T2	S2	-
	-	X	*Quadrula intermedia*	Cumberland monkeyface	Powell R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Quadrula sparsa*	Appalachian monkeyface	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Toxolasma lividum*	Purple lilliput	N Fk Holston R, Clinch R	Aquatic-rivers.	S	G3Q	SH	-
	-	X	*Villosa perpurpurea*	Purple bean	Clinch R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
	-	X	*Villosa trabalis*	Cumberland bean	Clinch R	Aquatic-rivers.	E	G1	SX	-
Spider (Arachnid)										
	-	X	*Microhexura montivaga*	Spruce-fir moss spider	Whitetop Mtn	Damp, well-drained moss and liverwort mats on boulders in mature spruce-fir forests.	E	G1	S1	-
Amphipod (Crustacean, Order Amphipoda)										
	-	X	*Stygobromus abditus*	James Cave amphipod	James, Sam Bells caves, Pulaski Co; Watsons cave, Wythe Co; and other New River caves.	Aquatic-caves, water well.	S	G3	S3	-
	-	X	*Stygobromus emarginatus*	Greenbrier Cave amphipod	Greenbrier, Monroe Cos, WV	Aquatic-caves. In caves under gravel in streambeds, occasionally in pools. Most abundant in smallest trickles of water. Primarily in tiny first and second order headwater cave streams.	S	G3	-	S3
	X	-	*Stygobromus gracilipes*	Shenandoah Valley cave amphipod	Frederick, Rockingham, Shenandoah, Warren Cos	Aquatic-caves.	S	G3G4	S3	S1
	X	-	*Stygobromus hoffmani*	Alleghany County cave amphipod	Low Moor cave, Alleghany Co	Aquatic-caves, groundwater habitats including springs and seeps.	S	G2	S2	-
	X	-	*Stygobromus mundus*	Bath County cave amphipod	Alleghany, Bath Cos	Aquatic-caves.	S	G2G3	S1S2	-
	-	X	*Stygobromus pollostus*	Least Cave stygobromid	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G2G3	-	S3
	-	X	*Stygobromus spinatus*	Spiny Cave stygobromid	Southern Monroe Co, north-northeast to central Pocahontas, Co, WV, primarily within the Greenbrier Valley. Covers a linear distance of ~67 miles.	Aquatic-caves. In gravels of small streams and in small cave pools.	S	G2G3	-	S2
Isopod (Crustacean, Order Isopoda)										
	X	-	*Antrolana lira*	Madison Cave Isopod	Documented population centers in Waynesboro-Grottoes area, Augusta Co; Harrisonburg area Rockingham Co; valley of main stem of Shenandoah R, Warren, Cos,VA: Jefferson Co, WV. Not known from GWNF.	Aquatic-subterranean obligate in caves and karst groundwater.	T	G2G4	S2	S1
	-	X	*Caecidotea incurva*	Incurved cave isopod	McCullin Cave, Smyth Co; Groseclose Cave No. 1, Wythe Co	Aquatic-caves.	S	G2G4	S2	-
	X	X	*Miktoniscus racovitzai*	Racovitza's terrestrial cave isopod	Alleghany, Botetourt, Page, Rockbridge, Shenandoah Cos	Aquatic-caves.	S	G3G4	S2	-
Crayfish (Crustacean, Order Decapoda)										
	-	X	*Cambarus callainus*	Big Sandy crayfish	In VA, Upper Russell Fk drainage Big Sandy R	Aquatic-streams. Fast flowing streams of moderate width. Formerly: *Cambarus veteranus*.	T	G2	S1S2	S1
Centipede (Insect, Order Chilopoda)										
	X	X	*Escaryus cryptorobius*	Montane centipede	The Priest, Nelson Co; Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Upper soil horizon, spruce-birch forests.	S	G2	S2	-
	-	X	*Escaryus orestes*	Whitetop Mountain centipede	Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Dark moist soil and litter, spruce-birch forests.	S	G1G2	S1S2	-
Springtail (Insect, Order Collembola)										
	X	-	*Pygmarrhopalites sacer*	A cave springtail	Bath Co	Caves.	S	G2	S2	-
Dragonfly (Insect, Order Odonata)										
	X	X	*Gomphus viridifrons*	Green-faced clubtail	New R, Craig Ck, Pound R, Locust Spring	Aquatic-rivers.	S	G3G4	S2	S2
	-	X	*Ophiogomphus howei*	Pygmy snaketail	Upper New R; Carroll, Grayson, Wythe Cos	Aquatic-rivers.	S	G3	S1S2	-
Stonefly (Insect, Order Plecoptera)										

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	-	X	*Allocapnia fumosa*	Smokies snowfly	High elevation rheocrenes (flowing springs) of Mt. Rogers. Grayson, Smyth Cos.	Aquatic-streams.	S	G2	S1S2	
	-	X	*Megaleuctra williamsae*	Smokies needlefly	Mt Rogers & Whitetop Mtn	Aquatic-streams.	S	G2	S1S2	-
	-	X	*Taeniopteryx nelsoni*	Cryptic willowfly	Lewis Fk & Grindstone Branch N of Mt Rogers	Aquatic-streams.	S	G1	S1	-
Beetle (Insect, Order Coleoptera)										
	X	X	*Cicindela patruela*	Northern barrens tiger beetle	Blue Ridge, Ridge & Valley	Eroded slopes of exposed sandstone and conglomerate.	S	G3	S2	S2S3
	-	-	*Pseudanophthalmus avernus*	Avernus Cave beetle	Endemic to Endless Caverns (commercial cave, non-FS) Rockingham Co.	Caves.	S	G1	S1	-
	-	X	*Pseudanophthalmus cordicollis*	Little Kennedy Cave beetle	Franklins Pit, Little Kennedy Cave, Omega Cave System, Wildcat Saltpetre Cave, Wise Co., VA	Caves.	S	G1	S1	-
	X	-	*Pseudanophthalmus intersectus*	Crossroads Cave beetle	Known only from Crossroads Cave, Millboro Springs, Bath Co.	Caves.	S	G1G2	S1	-
Scorpionfly (Insect, Order Mecoptera)										
	-	X	*Brachypanorpa jeffersoni*	Jefferson's short-nosed scorpionfly	Sugar Run Mountain, Giles Co; Whitetop Mtn, Smyth Co.	Moist soil around seeps. Only known from high elevation. Larvae use short burrows in loose soil and moss.	S	G2	S1S2	-
Butterfly, Skipper, Moth (Insect, Order Lepidoptera)										
	-	X	*Atrytone arogos*	Arogos skipper	Historic records, Blacksburg area. Caldwell Fields records need to be verified.	Relatively undisturbed grasslands, prairies, sand prairies, serpentine barrens, grassland/herbaceous, old field. Larval host plant; big bluestem *Andropogon gerardi.*	S	G3	SH	-
	X	X	*Calephelis borealis*	Northern metalmark	Alleghany, Augusta, Bath, Botetourt, Craig, Lee, Montgomery, Russell, Scott Cos: Historic records from Giles, Rockbridge Cos.	Openings within forested or wooded areas, natural outcrops, shale or limestone barrens, glades or powerline right of ways. Larvae host plant; round-leaf ragwort, *Senecio obovatus.*	S	G3G4	S2S3	S2
	X	X	*Callophrys irus*	Frosted elfin	Frederick, Montgomery, Page, Roanoke Cos.	Dry, open woods, clearings, and road/powerline ROWs with abundant wild indigo, *Baptisia tinctoria*.	S	G3	S2?	S1
	X	X	*Danaus plexippus*	Monarch	Blue Ridge, Ridge & Valley	Mixed hardwood/conifer forest; shrubland; grassland/herbaceous; old field; suburban/orchard; cropland/hedgerow. Larval host plant; milkweeds *Asclepias* spp.	S	G4	S4	S4
	X	X	*Speyeria idalia*	Regal fritillary	Blue Ridge, Ridge & Valley	Riparian, grasslands-shrublands. Larval host plant, violets, *Viola* spp.	S	G3	S1	S1
	X	X	*Erora laeta*	Early hairstreak	Bedford, Botetourt, Page, Rockbridge, Warren, Wise Cos., VA; Monroe, Pendleton Cos., WV. Historic records from Giles, Montgomery Cos.	Hardwood forests or hardwood-northern conifer mixed forests. Larval host food, young fruit of American beech, *Fagus grandifolia*, nuts of beaked hazelnut *Corylus cornuta.* Canopy dweller.	S	GU	S2	S2
	X	X	*Erynnis martialis*	Mottled duskywing	Historic records from Augusta, Bedford, Botetourt, Craig, Montgomery, Rockbridge Cos.; St. Mary's R near entrance to Wilderness Area, Augusta Co.	Open woodland; barrens; open brushy fields. Larval host plant; New Jersey tea *Ceanothus americanus*.	S	G3	S1S3	S3
	X	X	*Erynnis persius persius*	Persius duskywing	Blue Ridge, Ridge & Valley	Bogs, wet meadows, open seepages in boreal forests. Larval host plant; lupine, *Lupinus perennis*, wild indigo, *Baptisia tinctoria*.	S	G5T1T3	S1	-
	X	-	*Pyrgus centaureae wyandot*	Appalachian grizzled skipper	Ridge & Valley	Shale barrens, open shaley oak woodlands. Larval host plant; cinquefoil, *Potentilla* spp, strawberry, *Fragaria virginina.*	S	G5T1T2	S1	S1
	X	X	*Catocala herodias gerhardi*	Herodias underwing	Bald Knob, Bath Co; Poverty Hollow, Montgomery Co; Sand Mtn, Wythe Co (non FS property)	Pitch pine/bear oak scrub woodlands, >3000'. Larval host plant; oak, *Quercus* spp.	S	G3T3	S2S3	SU
	-	X	*Catocala marmorata*	Marbled underwing	Montgomery Co	Mesic montane hardwood forests; Forested wetland, riparian. Larval host plants; willows/cottonwoods, *Salix/Populus*.	S	G3G4	S2	-
	X	-	*Euchlaena milnei*	Milne's euchlaena moth	Warm Springs Mtn, Catawba Creek Slopes, Sweet Spring Hollow, Salt Pond Mtn. (Doe Creek)	Moist, forested slopes of mixed pine hardwoods. Acidic oak woods.	S	G2G4	S2	S2
Bee (Insect, Order Hymenoptera)										
	X	X	*Bombus affinis*	Rusty-patched bumble bee	Bath and Highland Co, VA: new location on Warm Springs RD, Duncan Knob found 6/2017. Following VA/WV county occurrences historic (Alleghany, Carroll, Frederick, Giles, Grayson, Montgomery, Nelson, Page, Pulaski, Rockbridge, Rockingham, Wythe Cos., VA; Hardy, Hampshire, Monroe, Pendleton, Pocahontas Cos, WV).	Habitat generalist: grasslands, old field, mature woods, open woodlands, mixed farmland edges, marshes, urban areas. Feeds from a variety of plants for pollen and nectar, including flowering rhododendron and mountain laurel. Nest sites include abandoned rodent burrows, fallen dead wood, stumps. Queen only overwinters.	E	G1	SH	-
NON-VASCULAR PLANT										
Lichen										
	-	X	*Alectoria fallacina*	Witch's-hair lichen	Smyth, Grayson Co	S. Appalachian endemic. Conifer trees, especially fir rarely on birch, in spruce-fir forests; rarely fire cherry communities.	S	G2	SH	SNR
	-	X	*Gymnoderma lineare*	Rock gnome lichen	Whitetop Mtn	Spruce-fir forests.	E	G2	S1	-
	X	X	*Heterodermia appalachensis*	Appalachian shield lichen	St. Mary's Wilderness, Augusta Co.; Skidmore Fork, Rockingham Co.; Browns Run, Page Co.; rock outcrop, 6 mi. SE of Edinburg, Page Co.; summit of Whitetop Mt, Washington Co.	Bark of hardwoods, occasionally on shaded rocks.	S	G2?	S1	-
	-	X	*Heterodermia erecta*	A foliose lichen	Along Whitetop access road, 1.2 mile from summit, Grayson Co., VA.	S. Appalachian endemic.	S	G1?	S1	-
	-	X	*Hypotrachyna oostingii*	A foliose lichen	Mount Rogers, on Smyth, Grayson Co. line	Spruce-fir forests.	S	G2?	SU	-
	-	X	*Hypotrachyna virginica*	Virginia hypotrachyna lichen	Mt Rogers & Whitetop Mtn	Spruce-fir forests. Found on spruce, fir, rhododendron in spruce-fir and fire-cherry communities in S. Appalachian Mtns. Typically at higher elevations, has been found at lower elevations.	S	G1G2	S1	SNR
	-	X	*Lecanora masana*	A lichen	Whitetop Mtn, and Grayson, Smyth Cos	S. Appalachian endemic. Spruce-fir, northern hardwood-conifer forest.	S			

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	X	-	*Melanelia culbersonii*	Culberson's Black-parmelia	Massanutten (Fridley watershed) Rockingham Co; along trail from Wolf Gap Campground to Big Schloss, Shenandoah Co.	Rocks in open areas and on talus slopes. Fully exposed, minimally weathered quartzite and sandstone boulderfields at elevations from about 1000-3300 ft.	S	G2	S4	-
Liverwort										
	-	X	*Bazzania nudicaulis*	A liverwort	Mt Rogers & Whitetop Mtn	Bark and rock outcrops in spruce-fir forests.	S	G2G3	S?	-
	X	-	*Cephaloziella spinicaulis*	A liverwort	Along SR 33, 10 miles W of Harrisonburg.	Damp soil in crevices of shaded sedimentary rocks, in hemlock-hardwoods forest and humid to dry faces of ledges and cliffs in open oak-hickory forest.	S	G3G4	SNR	-
	-	X	*Leptoscyphus cuneifolius*	Wedge Flapwort	Grayson Co	Bark of Fraser fir.	S	G4G5	SH	-
	-	X	*Nardia lescurii*	A liverwort	Blue Ridge, Ridge & Valley	Riparian - on peaty soil over rocks, usually in shade and associated with water, <3000'.	S	G3?	S1	-
	-	X	*Plagiochila austinii*	A liverwort	Little Stony Ck – Cascades; Red Ck on Beartown Mtn	Rich, moist, densely forested ravines; shaded outcrops.	S	G3	S?	-
	-	X	*Plagiochila corniculata*	A liverwort	Grayson, Smyth Cos	Limited to densely shaded, humid, often fog-enshrouded mountain summits, usually to the spruce-fir association. Most commonly found on Fraser fir.	S	G4?	SNR	-
	-	X	*Plagiochila sullivantii var. sullivantii*	A liverwort	Whitetop Mtn, Salt Pond Mtn	Moist shaded rock outcrops, under cliff ledges, in crevices.	S	G2T2	SNR	-
	X	X	*Plagiochila virginica*	A liverwort	Bath, Giles, Highland, Roanoke Cos	S. Appalachian endemic. Damp to intermittently dry calcareous or sandstone ledges or cliffs in partially exposed sites.	S	G3	SNR	SNR
	X	X	*Radula tenax*	A liverwort	Alleghany, Amherst, Dickenson, Giles, Highland, Nelson, Smyth, Washington Cos	Moist rocks or trees in mountains below spruce-fir zone; Depressed, dense mats on moist rocks, less frequently on tree trunks, in mountainous and hilly regions. Two discrete modes of occurrence: on shaded, damp rocks, and on tree bark in deep, moist forests. Does not tolerate submersion.	S	G3G4	SU	SNR
	-	X	*Sphenolobopsis pearsonii*	A liverwort	Mt Rogers & Whitetop Mtn	Bark of Fraser fir, mountain ash, occasionally on red spruce, >5000'.	S	G2	S?	-
Moss										
	-	X	*Sphagnum flavicomans*	Northeastern peatmoss	Whitetop Mtn	Bogs, seeps.	S	G3	SU	-
VASCULAR PLANT										
	-	X	*Abies fraseri*	Fraser fir	Grayson, Smyth Cos	S. Appalachian endemic. Spruce–fir forests, bogs >5000‘	S	G2	S1	SNR
	X	X	*Aconitum reclinatum*	Trailing white monkshood	Blue Ridge, Ridge & Valley	Rich cove sites, streambanks, seepages; all with high pH.	S	G3	S3	S3
	-	X	*Actaea rubifolia*	Appalachian black cohosh	Lower Clinch R watershed, Scott, Wise Cos	Moist, rich wooded bluffs over limestone.	S	G3	S1	-
	X	X	*Allium oxyphilum*	Nodding onion	Monroe, Summers, Mercer, Greenbrier Cos, WV	Shale barrens, sandstone glades.	S	G2	S1	S2
	X	-	*Arabis patens*	Spreading rockcress	Frederick, Lee, Page, Shenandoah, Warren Cos, VA; Hampshire, Hardy, Pendleton Cos, WV	Shaded, calcareous cliffs, bluffs, and talus slopes.	S	G3	S1	S2
	X	X	*Berberis canadensis*	American barberry	Blue Ridge, Ridge & Valley	Calcareous open woods, bluffs, cliffs, and along fencerows.	S	G3	S3S4	S1
	-	X	*Betula uber*	Virginia round-leaf birch	One location: Cressy Ck, Smyth Co.	Riparian, mixed open forest, usually disturbed sites.	T	G1Q	S1	-
	X	-	*Boechera serotina*	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods.	E	G2	S2	S2
	X	-	*Boltonia montana*	Mountain doll's-daisy	Augusta Co	Sinkhole ponds.	S	G1G2	S1	-
	-	X	*Botrychium jenmanii*	Alabama Grapefern	Russell & Wise Cos.	Open woods, old fields, pastures. Formerly: *Sceptridium jenmanii*	S	G3G4	SH	-
	X	X	*Buckleya distichophylla*	Piratebush	Blue Ridge S of Roanoke R, Ridge & Valley S of James R	Open oak and hemlock woods.	S	G3	S2	-
	-	X	*Cardamine clematitis*	Mountain bittercress	Blue Ridge, Ridge & Valley, S of New R watershed	Riparian, spring seeps, rocky streamsides.	S	G3	S1	-
	X	X	*Carex polymorpha*	Variable sedge	Blue Ridge, Ridge & Valley, N of James R	Open acid soil, oak-heath woodlands, responds positively to fire.	S	G3	S2	S1
	X	X	*Carex schweinitzii*	Schweinitz's sedge	Augusta, Bath, Highland, Montgomery, Pulaski, Washington Cos	Bogs, limestone fens, marl marshes.	S	G3G4	S1	-
	-	X	*Chelone cuthbertii*	Cuthbert turtlehead	Blue Ridge Plateau, Grayson, Carroll Cos	Bogs, wet meadows, boggy woods and thickets.	S	G3	S2	-
	-	X	*Cleistesiopsis bifaria*	Small spreading pogonia	Craig, Dickenson, Scott, Wise Cos	Well drained, rather open, scrubby hillsides, oak-pine-heath woodlands, acidic soils.	S	G4?	S2	S1
	-	X	*Clematis addisonii*	Addison's leatherflower	Montgomery, Roanoke, Botetourt, Rockbridge Cos	Open glades & rich woods over limestone and dolostone.	S	G1?	S2	-
	X	X	*Clematis coactilis*	Virginia white-haired leatherflower	Ridge & Valley, Rockbridge Co, S to Wythe Co	Shale barrens, rocky calcareous woodlands.	S	G3	S3	-
	X	-	*Clematis viticaulis*	Millboro leatherflower	Endemic to VA, only in Bath, Rockbridge Cos.	Shale barrens, open shaly woodlands.	S	G1	S1	-
	X	X	*Corallorhiza bentleyi*	Bentley's coralroot	Alleghany, Bath, Giles Cos VA; Monroe, Pocahontas Cos WV	Dry, acid woods, along roadsides, well-shaded trails.	S	G2	S2	S1
	X	X	*Delphinium exaltatum*	Tall larkspur	Blue Ridge, Ridge & Valley	Dry calcareous soil in open grassy glades or thin woodlands.	S	G3	S3	S2
	X	-	*Echinodorus tenellus*	Dwarf burhead	Pines Chapel Pond, Augusta Co	Pond margins, wet depressions in sandy soil.	S	G5?	S1	-
	X	X	*Echinacea laevigata*	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite.	E	G2G3	S2	-
	X	X	*Euphorbia purpurea*	Glade spurge	Blue Ridge, Ridge & Valley	Rich, swampy woods, seeps and thickets.	S	G3	S2	S2
	X	X	*Gaylussacia brachycera*	Box huckleberry	Alleghany, Bath, Bland, Carroll, Craig, Dickenson, Montgomery Cos	Dry, acidic forests, woodlands of oaks, pines, and other heaths.	S	G3	S1	S2
	X	X	*Gymnocarpium appalachianum*	Appalachian oak fern	Alleghany, Augusta, Bath, Highland, Page, Rockbridge, Rockingham, Warren Cos	Maple-birch-hemlock woods on mountain slopes and summits, moist sandstone, talus slopes, or bouldery colluvium. Requires cool, moist microclimate, typically on north-facing slopes with cold air seepage >2000’.	S	G3	S3	S1
	X	-	*Helenium virginicum*	Virginia sneezeweed	Endemic to Augusta, Rockingham Cos.	Seasonally dry meadows and sinkhole depressions.	T	G3	S2	-
	X	-	*Helonias bullata*	Swamp-pink	Augusta, Nelson Cos	Sphagnum bogs, seeps, and streamsides.	T	G3	S2S3	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	X	-	*Heuchera alba*	White alumroot	Shenandoah Mtn	High elevation rocky woods and bluffs.	S	G2Q	S1	S2
	X	X	*Ilex collina*	Long-stalked holly	Blue Ridge, Ridge & Valley	Bogs, seep, shrubby streamheads, >3100'.	S	G3	S1	S2
	-	X	*Iliamna corei*	Peter's Mountain-mallow	One location: Narrows, Peters Mountain, Giles Co.	Rich, open woods along sandstone outcrops, soil pockets, fire maintained.	E	G1	S1	-
	X	X	*Isotria medeoloides*	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain.	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	G2?	S2	S1
	X	X	*Juglans cinerea*	Butternut	Blue Ridge, Ridge & Valley	Well-drained bottomland and floodplain, rich mesophytic forests, mostly along toeslopes.	S	G4	S3?	S3
	X	X	*Liatris helleri*	Turgid gayfeather	Blue Ridge, Ridge & Valley	Shale barrens, mountain hillside openings. *L.turgida* synonymous with *L. helleri.*	S	GNR	S3	S2
	-	X	*Lilium grayi*	Gray's lily	Blue Ridge, Mt Rogers & Whitetop Mtn (occurrences north of Floyd Co questionable).	Bogs, open seeps, wet meadows, grassy balds.	S	G3	S2	-
	X	X	*Monotropsis odorata*	Sweet pinesap	Blue Ridge, Ridge & Valley	Dry oak-pine-heath woodlands, soil usually sandy.	S	G3	S3	S1
	-	X	*Packera millefolium*	Piedmont ragwort	Lee, Scott Cos	Open limestone outcrops and cedar barrens.	S	G2	S2	-
	X	X	*Parnassia grandifolia*	Largeleaf grass-of-Parnassus	Augusta, Bland, Giles, Grayson, Lee, Montgomery, Russell, Washington, Wythe	Fens, thinly wooded, gravelly seeps over limestone, dolomite, amphibolite, and ultramafic rocks; restricted to calcareous or magnesium-rich soils.	S	G3	S1	-
	X	-	*Paxistima canbyi*	Canby's mountain lover	Ridge & Valley, Sarver Barrens SBA, Craig Co	Calcareous cliffs and bluffs, usually undercut by stream.	S	G2	S2	S2
	X	X	*Phemeranthus teretifolius*	Quill fameflower	Amherst, Augusta (west side of Blue Ridge, near Laurel Springs Gap, Humpback Mtn SBA), Bedford, Carrol, Craig (Bald Mtn SBA), Grayson, Montgomery, Nelson, Page, Roanoke, Rockingham, Warren Cos, VA; Hardy & Hampshire Cos, WV	Calcareous sandstone glades, metabasalt barrens. Also *Talinum teretifolium* (Roundleaf fameflower)	S	G4	S4	S1
	X	X	*Phlox buckleyi*	Sword-leaf phlox	Blue Ridge, Ridge & Valley	Open, often dry oak woodlands and rocky slopes, usually over shale in humus rich soils, often along roadsides.	S	G2	S2	S2
	X	X	*Poa paludigena*	Bog bluegrass	Blue Ridge, Ridge & Valley	Shrub swamps and seeps, usually under shade.	S	G3	S2	S1
	X	-	*Potamogeton hillii*	Hill's pondweed	Bath Co	Clear, cold calcareous ponds.	S	G3	S1	-
	X	-	*Potamogeton tennesseensis*	Tennessee pondweed	Ridge & Valley	Ponds, back water of streams and rivers.	S	G2G3	S1	S2
	X	X	*Pycnanthemum torrei*	Torrey's mountain-mint	Bland, Bath, Giles, Rockbridge, Wythe Cos	Open, dry rocky woods, roadsides, and thickets near streams, heavy clay soil over calcareous rock.	S	G2	S2	S1
	X	X	*Scirpus ancistrochaetus*	Northeastern bulrush	Ridge & Valley	Mountain ponds, sinkhole ponds in Shenandoah Valley.	E	G3	S2	S1
	X	X	*Scutellaria saxatilis*	Rock skullcap	Blue Ridge, Ridge & Valley	Rich, dry to mesic ridgetop woods, 32 counties in VA, likely G4/S4.	S	G3	S3	S2
	-	X	*Silene ovata*	Mountain catchfly	Dickenson, Lee, Wise Cos	Rich woodlands and forests over limestone.	S	G3	S1	-
	-	X	*Spiraea virginiana*	Virginia spiraea	Blue Ridge, Ridge & Valley, S of New R	Scoured banks of streams, riverside or island shrub thickets.	T	G2	S1	S1
	X	X	*Thermopsis mollis*	Soft-haired thermopsis	Amherst, Bath, Bedford, Botetourt, Montgomery, Rockbridge Cos	Dry, open forests, woodlands, and clearings.	S	G3G4	S3	-
	X	X	*Trifolium virginicum*	Kate's Mountain clover	Alleghany, Augusta, Bath, Botetourt, Craig, Frederick, Highland, Rockbridge, Rockingham, Shenandoah, Warren Cos	Shale barrens.	S	G3	S3	S3
	-	X	*Tsuga caroliniana*	Carolina hemlock	Blue Ridge north to James R.	Rocky ridges and slopes, usually dry and well drained.	S	G3	S3	-
	X	X	*Vitis rupestris*	Sand grape	Ridge & Valley	Scoured banks of rivers and streams over calcareous bedrock.	S	G3	S1	S2

LEGEND FOR TES SPECIES LIST IN OCCURRENCE ANALYSIS RESULTS:

OAR CODES:

1 = Project located out of known species range.
2 = Lack of suitable habitat for species in project area.
3 = Habitat present, species was searched for during field survey, but not found.
4 = Species occurs in project area, but outside of activity area.
5 = Field survey located species in activity area.
6 = Species not seen during field survey, but possibly occurs in activity area based on habitat observed; or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.
7 = Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).
8 = Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
9 = Project occurs in a 6th level watershed included in the USFWS/FS T&E Mussel and Fish Conservation Plan (August 8, 2007 U.S. Fish & Wildlife Service concurrence on updated watersheds). Conservation measures from the USFWS/FS T&E Mussel and Fish Conservation Plan applied.
10 = Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia.

SPECIES: The term "species" includes any subspecies of fish, wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature (Endangered Species Act of 1973, as amended through the 100th Congress).

RANGE: The geographical distribution of a species. For use here "range" is expressed as where a species is known or expected to occur on or near the George Washington and Jefferson National Forests in terms of landform (feature name, physiographic province), political boundary (county name), or watershed (river, or stream name).

HABITAT: A place where the physical and biological elements of ecosystems provide a suitable environment and the food, cover and space resources needed for plant and animal livelihood (FSM 2605-91-8, pg. 10 of 13).

TES CODES:

T = Federally listed as Threatened
E = Federally listed as Endangered
P = Federally Proposed as T or E
S = Southern Region (R8) Sensitive species

GLOBAL RANK: Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, NatureServe and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species or variety. This system was developed by The Nature Conservancy and is widely used by other agencies and organizations as the best available scientific and objective assessment of taxon rarity and level of threat to its existence. The ranks are assigned after considering a suite of factors including number of occurrences, numbers of individuals, and severity of threats.

G1 = Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 = Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.
G4 = Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.
G5 = Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.
GH = Formally part of the world's biota with the exception that may be rediscovered.
GX = Believed extinct throughout its range with virtually no likelihood of rediscovery.
GU = Possibly rare, but status uncertain and more data needed.
G? = Unranked, or, if following a ranking, ranking uncertain (ex. G3?).
G_Q = Taxon has a questionable taxonomic assignment, such as G3Q.
G_T = Signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

STATE RANK: The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources (NHRs) are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
- **S2** - Very rare; usually between 6 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.
- **S3** - Rare to uncommon; usually between 21 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- **S4** - Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
- **S5** - Very common; demonstrably secure under present conditions.

- **SA** - Accidental in the state.
- **S#B** - Breeding status of an organism within the state.
- **SH** - Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#N** - Non-breeding status within the state. Usually applied to winter resident species.
- **SR** – Reported for Virginia, but without persuasive documentation that would provide a basis for either accepting or rejecting the report.
- **SU** - Status uncertain, often because of low search effort or cryptic nature of the element.
- **SX** - Apparently extirpated from the state.
- **SZ** - Long distance migrant, whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.
- **NA** – Not Applicable- A conservation status rank in not applicable because the species is not a suitable target for conservation activities.

These ranks should not be interpreted as legal designations.

George Washington and Jefferson National Forests - Locally Rare Species List
Global and State Ranks based on 2018 NatureServe rankings. (List Revised: February 2019)

VA-DCR/DNH - Virginia Department of Conservation and Recreation, Division of Natural Heritage.

WV-DNR/WDU - WV Division of Natural Resources, Wildlife Diversity Unit.

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
VERTEBRATES										
Fish										
X	_	*Cottus girardi*	Potomac sculpin	Ridge and Valley. James R drainage, Cowpasture R. Widespread. Occupies all major hydrographic subdivisions of Potomac drainage, except on lower Piedmont and Coastal Plain. Avoids the Blue Ridge, to which it has ready access.	Aquatic-streams.	___	G4	S3S4	S4S5	
_	X	*Chrosomus tennesseensis*	Tennessee dace	Lick Ck, N Fk Holston R, Beaverdam Ck, M Fk Holston R.	Aquatic-streams.	E	G3	S1	___	Synonym: *Phoxinus tennesseensis.*
_	X	*Cyprinella whipplei*	Steelcolor shiner	In VA, known from only five sites in the Clinch R.	Aquatic-streams, rivers.	T	G5	S1	S4	Synonym: *Notropis whipplei.*
_	X	*Etheostoma chlorobranchium*	Greenfin darter	In VA, known only from L Whitetop Laurel Ck; Tributary to Laurel Ck of S Fk of Holston R system.	Aquatic-streams.	T	G4	S1	___	
_	X	*Notropis spectrunculus*	Mirror shiner	U, S, M Fk Holston; Clinch; Powell R; Smyth Co.	Aquatic-streams, rivers.	___	G4	S2	___	
_	X	*Phenacobius crassilabrum*	Fatlips minnow	Unimpounded lower S Fk Holston R, Whitetop Laurel Ck.	Aquatic-rivers.	___	G3G4	S2	___	
_	X	*Uranidea baileyi*	Black sculpin	Little R, U Clinch R, S Fk Holston R.	Aquatic-streams.	___	G4Q	S2	___	Synonym: *Cottus baileyi.*
Amphibian										
X	_	*Ambystoma tigrinum*	Tiger salamander	Augusta Co.	Seasonally dry sinkhole ponds.	E	G5	S1	___	
_	X	*Desmognathus marmoratus*	Shovel-nosed salamander	Five sites near Whitetop Mtn in Grayson, Washington Cos.	Aquatic-streams.	___	G4	S2	___	
_	_	*Plethodon shenandoah*	Shenandoah salamander	Three isolated populations in SNP, Hawksbill Mtn, The Pinnacles, Stony Man Mtn. Erroneous records from Three Ridges, The Priest, Pompeii on the Pedlar RD.	Talus slopes.	E	G1	S1	___	
Reptile										
X	_	*Opheodrys vernalis*	Smooth greensnake	Alleghany, Augusta, Bath, Craig, Highland, Page, Rockingham, Roanoke Cos.	Mesic habitats; wet meadows; bog and marsh edges; open woodlands.	___	G5	S3	S5	Synonym: *Liochlorophis vernalis.*
X	_	*Plestiodon anthracinus*	Coal skink	Alleghany, Augusta, Bath, Botetourt, Montgomery, Rockbridge, Rockingham Cos.	Humid, wooded or rocky hillsides (mixed pine-hardwoods). Under logs, rocks, leaf litter on forest floor.	___	G5	S3	S2	Synonym: *Eumeces anthracinus.*
X	_	*Virginia valeriae pulchra*	Mountain earthsnake	Northwestern Highland Co.	Deciduous hardwoods, mixed hardwood-pine, second growth; short grassy slopes over sandstone. Found in rich deciduous woodlands, fields, pastures and gardens where the soil is loose enough to burrow	___	G5T3T4	S1S2	S2	
Bird										
X	X	*Accipiter cooperii*	Cooper's Hawk	Potts Mtn, Craig Co.; Mt. Rogers, Grayson, Smyth Cos.; Highland, Lee, Scott, Wise Cos.	Woodlands, forest edges, river groves, deciduous woods, broken woodlands, along streams.	___	G5	S3B/S3N	S3B/S4N	
X	X	*Accipiter striatus*	Sharp-shinned Hawk	Alleghany, Giles, Grayson, Scott, Smyth, Tazewell, Washington Cos.	Coniferous forests; woodland edges; mixed woodlands, especially coniferous-birch-aspen forests.	___	G5	S3S4	S3B/S4N	
X	X	*Aegolius acadicus*	Northern Saw-whet Owl	Rare transient and winter visitor. Rare and very local summer resident at high elevations with summer records from Bath, Grayson, Highland, Smyth and Tazewell Cos. Breeding: Laurel Fk, Highland Co; Shenandoah Co; Mt Rogers, Grayson Co.	Mixed coniferous-deciduous woods.	___	G5	S1B/S2N	S2B/S2N	
X	X	*Aquila chrysaetos*	Golden Eagle	Transient and winter visitor; winter resident in southwestern VA and Highland Co. Rare Summer visitor. No firm breeding records.	Mostly forested ridgetops with scattered openings.	___	G5	SHB/S1N	S3N	
X	X	*Catharus guttatus*	Hermit Thrush	Common transient and uncommon winter resident. Highland, Page, Russell Co; Shenandoah Mtn, Rockingham; Beartown Mtn, Tazewell; Whitetop Mtn, Mt Rogers, Grayson, Smyth, Washington Cos.	Northern and montane coniferous forests.	___	G5	S1B/S5N	S3B/S4N	
X	X	*Catharus ustulatus*	Swainson's Thrush	Rare summer resident on Mt. Rogers since 1966, Grayson Co; Beartown, Tazewell Co; Highland Co.	Dense shaded woods, mixed coniferous woods.	___	G5	S1B	S3B	
X	X	*Certhia americana*	Brown Creeper	Highland Co; Mt Rogers, Grayson, Smyth, Washington Cos.	Mature woods; dense coniferous, deciduous, mixed woodlands; wooded swamps with standing snags with loose bark.	___	G5	S3B/S5N	S3B/S4N	
X	X	*Cistothorus platensis*	Sedge Wren	Augusta, Bath, Bland Cos.	Wet meadows; damp, tall-grass meadows with scattered bushes.	___	G5	S1B/S1S2N	S1B	
X	X	*Contopus cooperi*	Olive-sided Flycatcher	Highland, Nelson, Smyth Cos.; Mt Rogers, Grayson, Smyth Cos.	Northern and montane coniferous forests.	___	G4	SHB	S1B	Synonym: *Nuttallornis borealis.*
X	X	*Empidonax alnorum*	Alder Flycatcher	Mt Rogers, Grayson Co. since 1974; Blacksburg; Bath, Highland, Tazewell Cos.	Alder swamps; near water in dense, low, damp thickets of alders, willows, sumacs, viburnum, elderberry, and red-osier dogwood.	___	G5	S1S2B	S3B	
_	X	*Empidonax flaviventris*	Yellow-bellied Flycatcher	Summer records since 1973, Mount Rogers, Grayson, Smyth Cos.	Predominantly Spruce-Fir forests. Low, swampy thickets bordering ponds and streams; sphagnum bogs; alder swamps; wet mossy glades; cool, moist mountain sides.	___	G5	S1B	SHB	
X	X	*Falco peregrinus*	Peregrine Falcon	Hack sites late 80s and early 90s – Mt Rogers, Grayson; Cole Mtn, Amherst; Big Schloss, Shenandoah; Elliot Knob, Augusta; High Knob, Rockingham Cos. No nests, current migrant.	Nests on ledges or cliffs, buildings, bridges, quarry walls. Non-breeding sites, farmland, open country, lakeshores, broad river valleys, airports, cities.	T	G4	S1B/S2N	S1B/S2N	
X	X	*Geothlypis philadelphia*	Mourning Warbler	Locust Springs, Highland Co.; Elliott Knob, Augusta Co.; Paddy Knob, Bath Co.; Mount Rogers, Grayson, Smyth Cos.	Brushy, woodland clearings; forest edges; brushy edges of marshes and bogs; dense second-growth thickets.	___	G5	S1B	S3B	Synonym: *Oporornis philadelphia.*
X	X	*Haemorhous purpureus*	Purple Finch	Highland Co; Mt. Rogers and Whitetop Mtn, Grayson, Smyth, Washington Cos	Spruce-Fir forests.	___	G5	S1B/S5N	S4B/S4N	Synonym: *Carpodacus purpureus.*
X	_	*Haliaeetus leucocephalus*	Bald Eagle	Potomac R, James R, New R, Upper Tennessee watersheds.	Feeds and nests on or near large lakes and rivers.	___	G5	S3S4B/S3S4N	S2B/S3N	2016 VA-DCR/DNH, Rare Animals List: Grank (G5), VA SRank (S3B/S3N).
X	_	*Lanius ludovicianus migrans*	Migrant Loggerhead Shrike	Ridge & Valley (Shenandoah Valley).	Open grasslands with trees and shrubs, fencerows.	T	G4T3Q	S1	S1B/S2N	2016 WV-DNR/WDU, Rare Animals List: Grank (G4T3Q), WV SRank (S1B/S1N).
_	X	*Limnothlypis swainsonii*	Swainson's Warbler	Holston, Big Sandy drainages of the southwestern mountains; most abundant in Breaks SP, Dickenson Co.; Whitetop, Mt. Rogers, Smyth Co.; Wise Co.	Moist lower slopes of mountain ravines (≤ 2800') of Rhododendron and laurel species; sawtimber, pole stands of second-growth cove forests; Dense understory, vegetation.	___	G4	S2B	S3B	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	X	*Loxia curvirostra*	Red Crossbill	Glen Alton, Giles Co.; Mt Rogers, Whitetop Mtn, Grayson, Smyth Cos.; Highland Co.; Shenandoah Mt. Area, Rockingham Co.	Associated with, but not confined to conifers; northern hardwood hemlocks and red spruce; On Shenandoah Mt in pine-oak woods.	___	G5	S1	S2N	2016 WV-DNR/WDU, Rare Animals List: Grank (G5), WV SRank (S2B/S2N).
X	_	*Melospiza georgiana georgiana*	Swamp Sparrow	Highland Co.	Prefers swampy wetlands with emergent vegetation; wetlands with bushes, brushy wet meadows, sloughs, bogs, swamps, freshwater marshes, along swampy shorelines of lakes.	___	G5T5	S1B/S4S5N	S3B/S4N	
X	X	*Oreothlypis ruficapilla*	Nashville Warbler	Augusta, Highland, Rockingham, Shenandoah, Warren Cos.; Mount Rogers, Grayson, Smyth Cos. No confirmed breeding records, but three adults with one fully fledged juvenile, 1986, Elliot Knob, Augusta Co.	Brushy sphagnum bogs, open second-growth woodlands, burned or cut areas, overgrown pastures, fields, woodland edges.	___	G5	S1B	S1B	Synonym: *Vermivora ruficapilla.*
X	X	*Parkesia noveboracensis*	Northern Waterthrush	Northwestern Highland Co.; Bath Co.; Peaks of Otter area; Mt Rogers, Grayson, Smyth, Washington Cos.	Cool, shady, wet, brushy areas with open pools and thickets along edges of swamps, ponds and wooded streams with numerous fallen trees. Woodlands and shrubs around standing water.	___	G5	S1B	S2B	Synonym: *Seiurus noveboracensis.*
X	X	*Regulus satrapa*	Golden-crowned Kinglet	Mt Rogers, Grayson Co.; Highland, Smyth, Washington, Wythe Cos.	Spruce-Fir forests.	___	G5	S2B/S5N	S4B/S4N	
X	X	*Setophaga cerulea*	Cerulean Warbler	Peaks of Otter area Bedford, Botetourt Cos.; Bath, Craig, Dickenson, Giles, Lee, Scott, Wise Cos.	Shady, mature upland woods. Prefers forests with tall deciduous trees and little undergrowth.	___	G4	S3S4B	S2B	Synonym: *Dendroica cerulea.*
X	X	*Setophaga fusca*	Blackburnian Warbler	Augusta Co.; Mountain Lake, Giles Co.; Laurel Fork, Highland Co.; Mount Rogers, Smyth, Grayson Cos.; Russell Co.	Upper canopy of mature conifer forests with few deciduous trees with sparse understory; shrubs around forest edges.	___	G5	S2B	S3B	Synonym: *Dendroica fusca.*
X	X	*Setophaga magnolia*	Magnolia Warbler	Northwestern Highland Co; Mt Rogers, Grayson, Smyth, Washington Cos; Russell, Scott Cos	Open coniferous or mixed coniferous-deciduous woodlands. Spruce-Fir forests; coniferous bogs; dense thickets of spruce-fir; old clearings with small conifers.	___	G5	S2B	S4B	Synonym: *Dendroica magnolia.*
X	X	*Sitta canadensis*	Red-breasted Nuthatch	Mt Rogers, Grayson, Smyth, Washington Cos.; Highland, Rockingham, Russell Cos.	Prefers coniferous forests, but sometimes occurs in mixed and deciduous woodlands.	___	G5	S2B/S4N	S4B/S4N	
X	X	*Sphyrapicus varius*	Yellow-bellied Sapsucker	In VA, rare and local summer resident. Amherst, Augusta, Bath, Highland Cos.; Mt Rogers, Grayson, Smyth Cos.	Deciduous, mixed deciduous-coniferous forests and woodlands with poplars. Usually > 3500'. Dead or live trees with heart rot for cavity nests.	___	G5	S1B/S4N	S1B/S3N	2016 WV-DNR/WDU, Rare Animals List: Grank (G5), WV SRank (S2B/S3N).
X	X	*Troglodytes hiemalis*	Winter Wren	Alleghany, Bland, Craig, Wise Cos.; Mt. Rogers area, Grayson, Smyth, Washington Cos.; Botetourt, Rockingham Cos.	Moist coniferous woodlands with low woody vegetation. Low lying cold bogs and swamps. Favors spruce-forests and dense, mixed and hardwood forests.	___	G5	S2B/S4N	S4B/S4N	Synonym: *Troglodytes troglodytes.*
X	X	*Thryomanes bewickii altus*	Appalachian Bewick's Wren	Historical records in Botetourt, Giles, Highland, Washington Cos.	Thickets, old fields, fencerows, old home sites.	E	G5T2Q	SHB	S1	2016 WV-DNR/WDU, Rare Animals List: Grank (G5T2Q), WV SRank (SX).
X	X	*Vermivora chrysoptera*	Golden-winged Warbler	Augusta, Bath, Botetourt, Giles, Highland, Rockbridge, Tazewell, Washington Cos.	Brushy edge habitats; openings with saplings, forbs, and grasses.	___	G4	S3B	S1B	
Mammal										
X	_	*Lepus americanus*	Snowshoe hare	Known from only three sites in Highland Co.	Spruce-Fir forests.	E	G5	S1	S3	
X	X	*Lontra canadensis*	Northern river otter	Millboro Springs; James R; Cowpasture R; N and S Fk Shenandoah R; Big Otter Ck; New R at McCoy.	Forested wetlands; herbaceous wetlands; riparian areas; scrub-shrub wetlands.	___	G5	S4	S4	Also called North American river otter.
X	X	*Martes pennanti*	Fisher	No evidence of reproducing population in VA. Expanding from WV.	Red spruce and mixed hardwood forests.	___	G5	S1	S3	
X	_	*Microtus chrotorrhinus carolinensis*	Southern rock vole	Alleghany Mtn, Bath Co.	Cool, moist, mossy talus under oaks/northern hardwoods.	E	G4T3	S1	S2	
X	X	*Mustela nivalis*	Least weasel	Upper piedmont and mountains.	Elevations 500'-3800' in pasturelands, brushy fence rows, weedy fence rows between hayfields, old fields.	___	G5	S3	S3	
X	X	*Neotoma magister*	Alleghany woodrat	Range in VA uncertain, sites are being monitored presently to determine status. Seems to be presently found over entire forest.	Rocky areas; Caves; large boulderfields.	___	G3G4	S3	S3	
X	_	*Sorex palustris punctulatus*	Southern water shrew	Alleghany Mtn, Bath Co; Laurel Fork, Highland Co.	Riparian areas within spruce-fir forests and northern hardwoods.	E	G5T3	S1S2	S1	
INVERTEBRATES										
Snail (Mollusk, Class Gastropod)										
X	X	*Fontigens tartarea*	Organ Cave snail	Rock Camp Cave (1 mile from FS), McClung-Zenith Cave (1.5 mile from FS), Monroe Co., WV; Greenbrier, Pocahontas, Randolph, Tucker Cos., WV; Bath, Highland Cos., VA.	Caves. Inhabits cave streams under flat rocks.	___	G2	S1S2	S2	
X	_	*Helicodiscus lirellus*	Rubble coil	Rockbridge Co.	Calciphile; limestone rubble and rich fossiliferous shale talus. Found among leaf litter and limestone stones or talus, or rich shale scree, upon steep, forested slopes which are associated with certain rivers in the upper James River watershed, including Maury R & Kerr's Ck.	E	G1	S1	___	
_	X	*Paravitrea reesei*	Round supercoil	Monroe Co., WV. Grayson, Montgomery, Pulaski, Smyth Cos., VA.	Calcareous woodlands and glades. Prefers moist environments.	___	G3	S2	S2	
Mussel (Mollusk, Class Bivalvia)										
_	X	*Leptodea fragilis*	Fragile papershell	Lee, Russell, Scott, Wise Cos.	Aquatic-streams, rivers.	T	G5	S1	S2	
_	X	*Ligumia recta*	Black sandshell	Lower reaches M Fk Holston R, Washington Co.; N Fk Holston R, Scott Co. near VA/TN border; Clinch R from Dungannon; Scott Co. near VA border	Aquatic-rivers.	T	G5	S2	S2	
_	X	*Truncilla truncata*	Deertoe	Only in Clinch R from Dungannon, Scott Co. to VA/TN border; Powell R from Poteet Ford, Lee Co. to VA-TN line.	Aquatic-rivers.	E	G5	S1	S1	
Spider (Arachnid)										
X	_	*Amaurobius borealis*	An amaurobiid spider	Known from only one site in VA: Tomahawk Mtn, Rockingham Co.	Mixed hardwoods.	___	G5	S1S3	___	
X	_	*Clubiona spiralis*	A two-clawed hunting spider	Known from only one site in VA: Tomahawk Mtn, Rockingham Co.	Mixed hardwoods.	___	G4	S1S3	SNR	Also called a Leafcurling sac spider.
X	X	*Phanetta subterranea*	A cave obligate spider	Ridge and Valley (common and widespread); Frederick to Lee Cos.	Caves.	___	G5	S4	S3	
_	X	*Xysticus emertoni*	Emerton's crab	Whitetop area of Mt. Rogers, Grayson Co	Open meadows.	___	G5	S1S3	___	
Pseudoscorpion (Arachnid, Order Pseudoscorpionida)										
_	X	*Kleptochthonius orpheus*	Orpheus cave pseudoscorpion	Patton Cave, Monroe Co., WV.	Caves.	___	G1	___	S1	
Amphipod (Crustaceans, Order Amphipoda)										
_	X	*Stygobromus cumberlandus*	Cumberland cave amphipod	Lee, Scott, Wise Cos.	Aquatic-caves.	___	G3G4	S1S2	___	
_	X	*Stygobromus estesi*	Craig County cave amphipod	Caves in U Sinking Ck Valley and Potts Ck, Poverty Hollow seeps, Captain seeps.	Aquatic-caves, seeps.	___	G4	S3	___	
_	X	*Stygobromus fergusoni*	Montgomery County cave amphipod	Botetourt, Montgomery Cos.	Aquatic-caves.	___	G2G3	S1	___	

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GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Stygobromus morrisoni*	Morrison's cave amphipod	Bath, Highland Cos., VA; Hardy, Pendleton Cos., WV.	Caves.	___	G2G3	S1S2	S1	
_	X	*Stygobromus redactus*	Patton cave stygobromid	Patton Cave, near Gap Mills, Monroe Co., WV.	Caves. Small, mud-bottomed seep pools.	___	G1	___	S1	
		Stygobromus sp. nov.	an amphipod	Scott Co.	Aquatics - Caves.	___	___	___	___	
X	_	*Stygobromus sp. 7*	Sherando spinosoid amphipod	Endemic to VA, apparently limited to the Sherando/Big Levels area, Augusta Co.	Springs.	___	G2	S2	___	
–	–	*Stygobromus sp. 17*	Massanutten spring amphipod	No data.	No data.	___	G2	S2	___	
–	–	*Stygobromus sp. 18*	Big Levels spring amphipod	No data.	No data.	___	G1?	S1?	___	
_	X	*Stygobromus sp. 19*	an amphipod	Scott Co.	Caves.	___	G1	S1	___	
_	_	*Stygobromus sp. 23*	Shenandoah Mountain spring amphipod	No data.	No data.	___	G1?	S1?	___	
Isopod (Crustaceans, Order Isopoda)										
X	_	*Caecidotea holsingeri*	Greenbrier Valley cave isopod	Ridge and Valley; 10 sites throughout Allegheny, Bath, Giles, Highland Cos., VA.; Greenbrier Co., WV.	Caves and springs.	___	G5	S3	S3	
Millipede (Class Diplopoda)										
_	X	*Brachoria cedra*	Cedar millipede	Jonesville, Lee Co.; High Knob, Wise Co.	Cedar glades. Leaf litter within mixed hardwoods.	___	G2G3	S2S3	___	
_	X	*Brachoria dentata*	Pennington Gap mimic millipede	Known only from Pennington Gap and Cave Spring Recreation Area, Lee Co.	Leaf litter, deciduous forests.	___	G1	S1	___	
_	X	*Brachoria eutypa ethotela*	Hungry Mother millipede	Pine Mtn above Troutdale.	Leaf litter, deciduous forests.	___	GNRTNR	S3	___	
_	X	*Brachoria insolita*	A millipede	Known from only two sites: High Knob area, Scott, Wise Cos.	Leaf litter within mixed hardwoods.	___	G1	S1	___	
_	X	*Buotus carolinus*	A millipede	Brush Mt;, Whitetop Mtn; Apple Orchard Mtn; Tazewell Beartown.	Beech leaf litter, deciduous forests.	___	G3	S3	___	
X	_	*Cleidogona fidelitor*	Faithful millipede	Known from only one site: Mt. Torry Furnace near Sherando Lake, Augusta Co.	Leaf litter within mixed hardwoods.	___	G2G4	S2S4	___	
_	X	*Cleidogona hoffmani*	Hoffman's cleidogonid millipede	Mt Rogers, Whitetop Mtn, Elk Garden; Hamilton cave (private) Bland Co.	Mountaintop species, leaf litter, deciduous forests.	___	G3	S2S3	___	
_	X	*Cleidogona lachesis*	A millipede	Mt Rogers & Whitetop Mtn.	Beech leaf litter, deciduous forests.	___	G2	S1	___	
_	X	*Conotyla aeto*	Aeto millipede	Known from only one site in VA: Burks Garden area, Tazewell Co.	Leaf litter within mixed mesic hardwoods.	___	G1	S1	___	
_	X	*Conotyla celeno*	Celeno millipede	Known from only one site in VA: Comers Rock area of Mt Rogers, Grayson, Wythe Cos.	Leaf litter within mixed hardwoods.	___	G1	S1	___	
_	X	*Dixioria fowleri*	Fowler's millipede	Walker Mtn; Comers Rock on Iron Mtn; Laurel Ck; Damascas; 1/2 mile west of NRA office; Tazewell Beartown.	Leaf litter, deciduous forests.	___	G2T2	S2	___	
_	X	*Dixioria pela coronata*	A millipede	Endemic to Mt Rogers.	Leaf litter, northern hardwood and spruce-fir forests. Altitudinally restricted, >5000'.	___	G2T2	S2	___	
X	_	*Nannaria shenandoah*	Shenandoah Mountain xystodesmid millipede	One site: along Long Run Road, Rockingham Co.	Leaf litter, mixed oak forest.	___	G1	S1	___	
_	X	*Rudiloria trimaculata tortua*	A millipede	Known from only three localized and disjunct sites: Potts Mountain, Craig Co.; Mountain Lake, Giles Co.; Peaks of Otter, Bedford Co.	Leaf litter within mixed hardwoods.	___	G5T2	S2	___	
X	_	*Pseudotremia alecto*	A millipede	Griffith Knob, Alleghany Co.; near Mountain Grove Saltpetre Cave, Bath Co.	Leaf litter, deciduous forests.	___	GNR	SNR	___	
X	X	*Semionellus placidus*	A millipede	Hawksbill Mtn; Apple Orchard Mtn; Tomahawk Mtn.	Leaf litter, deciduous forests.	___	G3	S3 (old rank S2)	___	
_	X	*Zygonopus packardi*	Packards blind cave millipede	Hopkins Cave, Starnes Cave, Giles Co.; Hamilton Cave, Bland Co.; Tawny Cave, (private) Giles Co.	Caves.	___	G4	S3	S2	Synonym: *Trichopetalum packardi.*
X	_	*Zygonopus weyeriensis*	Grand Caverns blind cave millipede	Breathing Cave, Star Chaple Cave, Bath Co.; Mystic Cave, Pendleton Co., WV.	Damp areas in caves on organic debris.	___	G4	S2	S2	Synonym: *Trichopetalum weyeriensis.*
Centipede (Insect, Order Chilopoda)										
X	_	*Nampabius turbator*	A cave centipede	One known site: Low Moor cave, Alleghany Co.	Caves.	___	G1G2	S1	___	
Springtail (Insects, Order Collembola)										
X	_	*Cliforga alleghaniensis*	a springtail	Known from only one site in VA: Warm Springs Mtn, James River RD.	Forested area with predominantly oak, and rhododendron understory.	___	G1?	S1?	___	
X	X	*Pseudosinella gisini virginia*	A cave springtail	Spangler Cave, Indian Burial Cave, Lee Co.; Daugherty Cave, Russel Co.; Greenbrier, Monroe, Pocahontas Cos., WV.	Caves.	___	G3G4T2	S2	___	
X	X	*Pygmarrhopalites carolynae*	A cave springtail	Augusta, Bath, Highland, Lee, Wise Cos.	Caves.	___	G4	S3	___	Synonym: *Arrhopalites carolynae*
-	X	*Pygmarrhopalites commorus*	A cave springtail	Giles, Lee, Wise Cos.	Caves.	___	G2G3	S2S3	S1	Synonym: *Arrhopalites commorus*
Dipluran (Insects, Order Diplura)										
_	X	*Litocampa holsingeri? sp. 4?*	A dipluran	3 caves, Scott Co.	Caves.	___	G2	S1S2	___	
Mayfly (Insect, Order Ephemeroptera)										
-	X	*Leptophlebia johnsoni*	Johnson's pronggill mayfly	One location: Lewis Fk, north slope Mt Rogers.	Aquatic-streams.	___	G4	S1	___	
Damselfly (Insects, Order Odonata)										
X	X	*Calopteryx angustipennis*	Appalachian jewelwing	On island below ford of Craig Ck at Rt. 786, Botetourt Co.; along Passage Ck at Elizabeth Furnace, Shenandoah Co.	Aquatic-streams.	___	G4	S3	S3	
X	_	*Enallagma annexum*	Northern bluet	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, still water.	___	G5	S1	S2	Synonym: *Enallagma cyathigerum.*
X	_	*Enallagma hageni*	Hagen's bluet	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S3	S3S4	
X	_	*Lestes disjunctus*	Northern spreadwing	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S2	S3	
X	_	*Nehalennia intergricollis*	Southern sprite	Maple Flats area, Augusta Co.	Aquatic-ponds, still water.	___	G5	S3	___	
X	_	*Nehalennia irene*	Sedge sprite	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, sphagnum bogs, still water.	___	G5	S1S2	S3	
Dragonfly (Insects, Order Odonata)										
X	_	*Aeshna canadensis*	Canada darner	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, still water.	___	G5	S1	S3	
X	_	*Aeshna tuberculifera*	Black-tipped darner	Pond Flat, Alleghany Co.; Potts Pond, Alleghany, Craig Co.; Maple Flats, Augusta Co.; Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G4	S2S3	S3	2016 VA-DCR/DNH, Rare Animals List: Grank (G4), VA SRank (S2S3).
X	_	*Aeshna verticalis*	Green-striped darner	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	S2S3	
X	_	*Anax longipes*	Comet darner	Quarles Lake, Big Levels, Augusta Co.	Aquatic-ponds.	___	G5	S3	S3	
X	_	*Arigomphus furcifer*	Lilypad clubtail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	SH	___	
X	_	*Celithemis martha*	Martha's pennant	Spring Pond, Maple Flats area, Augusta Co.	Aquatic-ponds.	___	G4	S2	___	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Cordulegaster diastatops*	Delta-spotted spiketail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	S3S4	
X	_	*Cordulia shurtleffi*	American emerald	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S3	G4	
X	_	*Epitheca canis*	Beaverpond baskettail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	S1	2016 VA-DCR/DNH, Rare Animals List: Grank (G4), VA SRank (SH). Synonym: Gomphus borealis.
X	_	*Gomphus descriptus*	Harpoon clubtail	Shaws Fk at Rt. 250 near Headwaters, Highland Co.	Aquatic-ponds, streams.	___	G4	S1	S3	Animals List: Grank (G4), WV SRank (S2S3).
_	X	*Gomphus fraternus*	Midland clubtail	Phillips Ck, Wise Co.	Aquatic-ponds, streams.	___	G5	S2	S2	
X	X	*Lanthus parvulus*	Northern pygmy clubtail	Highland, Montgomery Cos., VA; Trout Branch, WV.	Aquatic-streams.	___	G4G5	S2	S3	2016 VA-DCR/DNH, Rare Animals List: Grank (G4), VA SRank (S2).
X	_	*Leucorrhinia frigida*	Frosted whiteface	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	SH	___	
X	_	*Leucorrhinia hudsonica*	Hudsonian whiteface	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds.	___	G5	S1	S3	
X	X	*Leucorrhinia intacta*	Dot-tailed whiteface	Buck Run Ponds near Locust Spring picnic area, Highland Co.; Potts bog, Craig Co.	Aquatic-ponds, streams.	___	G5	S3	S4	
X	_	*Ladona julia*	Chalk-fronted corporal skimmer	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S2S3	S4	Also called Chalk-fronted corporal skimmer.
_	X	*Ophiogomphus incurvatus alleghaniensis*	Allegheny snaketail	Rich Ck, Giles Co.	Aquatic-streams.	___	G3T2T3	S1	SX	Synonym: Ophiogomphus alleghaniensis.
X	_	*Phanogomphus borealis*	Beaverpond clubtail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	SX	
X	X	*Rhionaeschna mutata*	Spatterdock darner	Bullpasture River gorge near Williamsville, Highland Co; Shenandoah Pond, Augusta Co; marsh near Paint Bank, Craig Co.	Aquatic-ponds.	___	G4	S2	S1	Synonym: *Aeshna mutata*.
X	_	*Somatochlora elongata*	Ski-tipped emerald	Bearwallow Run Beaver ponds; Buck Run ponds near Locust Spring Picnic area; headwaters of Slabcamp Run; headwaters of S ranch Locust Spring Run, Highland Co.	Aquatic-ponds, streams.	___	G5	S1S2	S2	2016 WV-DNR/WDU, Rare Animals List: Grank (G5), WV SRank (S3).
X	_	*Somatochlora williamsoni*	Williamson's emerald	Buck Run beaver ponds, Locust Springs, Highland Co.	Aquatic-ponds, streams.	___	G5	SH	___	
X	_	*Sympetrum obtrusum*	White-faced meadowhawk	Bearwallow Run beaver ponds; Buck Run ponds near Locust Spring Picnic area; headwaters of Slabcamp Run, Highland Co.	Aquatic-ponds, streams.	___	G5	S2	S3	
X	_	*Tramea onusta*	Red saddlebags	Green Pond, Big Levels, Augusta Co.	Aquatic-ponds, streams.	___	G5	S1	S1	
Stonefly (Insect, Order Plecoptera)										
_	X	*Acroneuria kosztarabi*	Virginia stonefly	Station Spring Ck, Tazewell Co.	Aquatic-streams.	___	G1G2	S1S2	___	
_	X	*Isoperla major*	Big stripetail stonefly	Burkes Garden, Tazewell Co.	Aquatic-streams.	___	G1	S1	___	
Beetle (Insects, Coleoptera)										
X	X	*Cicindela ancocisconensis*	Appalachian tiger beetle	Alleghany, Bath, Highland, Lee, Rockbridge, Washington, Wise Cos.	Riparian - sandy/silty edges of streams and rivers.	___	G3	S2	S3	
_	X	*Cyclotrachelus incisus*	A ground beetle	Breaks Interstate Park, Dickenson Co. Not on GWJ property.	Dry, well drained site, red maple, magnolia, mountain laurel.	___	G4	S1	___	
X	X	*Hydraena maureenae*	Maureen's hydraenan minute moss beetle	Alleghany, Bath, Botetourt, Bland, Craig, Cos.	Interstitial water in riparian-shale substrate along stream edge.	___	G2?	S2?	___	
_	X	*Pseudanophthalmus fuscus*	A cave beetle	Flecher's, Fulton, Patton caves, Monroe Co, WV.	Caves.	___	G4	___	S2	
X	X	*Pseudanophthalmus hypertichosis*	A cave beetle	Greenbrier, Monroe, Pocahontas, Randolph Cos, WV.	Caves.	___	G5	___	S3	
X	_	*Pseudanophthalmus limicola*	Maddens cave beetle	Bakers Cave, Rockingham Co; Maddens Cave, Shenandoah Wild Cave, Shenandoah Caverns, Shenandoah Co.	Caves.	___	G1G2	S1	___	
X	_	*Pseudanophthalmus nelsoni*	Nelson's cave beetle	Arritt Mill Tunnel Cave, Blue Spring Cave, Alleghany Co.	Caves.	___	G1G2	S1	___	
X	_	*Pseudanophthalmus petrunkevitchi*	Petrunkevitch's cave beetle	Woods Cave, Page Co.; Skyline Caverns, Woods Cave, Warren Co.	Caves.	___	G1G2	S1	___	
X	X	*Sphaeroderus schaumii*	Schaum's false snail-eating beetle	Range in VA is disjunct and localized. Front Royal, Hawksbill Mountain; trail to Apple Orchard Falls, Bedford Co.	Mixed hardwoods.	___	G4	S2	___	
Caddisfly (Insects, Order Tricoptera)										
X	_	*Nemotaulius hostilis*	A limnephilid caddisfly	Buck Run beaver ponds, Locust Springs, Highland Co.	Boreal type wetlands, beaver ponds.	___	G5	S1	SNR	
Butterfly (Insects, Order Lepidoptera)										
X	X	*Boloria selene*	Silver-bordered fritillary	Bath, Giles, Highland, Nelson Cos.	Herbaceous wetland, scrub-shrub wetland.	___	G5	S2	S3	
X	X	*Callophrys polios*	Hoary elfin	Augusta, Highland, Roanoke Cos.	Rocky slopes and ridges; outcrops, dry rocky forests and forest edges; acid bogs.	___	G5	S1S3	SH	Synonym: *Incisalia polia*.
X	_	*Colias interior*	Pink-edged sulphur	In VA, records are only from higher mountains of Highland Co.	Canadian Life Zones with acidic soils; > 3280'; forest openings; beaver meadows; rocky balds; upland dry fields; heaths; barrens; burn scars.	___	G5	S1S2	S1	
X	X	*Euchloe olympia*	Olympia marble	Augusta, Frederick, Giles, Highland, Lee, Rockingham, Shenandoah Cos.	Shale barrens and slopes; openings and right of ways.	___	G5	S2	S1	2018 VA-DCR/DNH, Rare Plants List: Grank (G4G5), VA SRank (S2).
X	X	*Phyciodes batesii*	Tawny crescent	No data.	Moist meadows and pastures in northern part of range; dry rocky sparsely wooded ridges or hillsides.	___	G5	SH	SX	
X	X	*Phyciodes batesii batesii*	Tawny crescent	Mountain Lake, Giles Co; Bedford, Botetourt, Frederick Cos.	Moist meadows and pastures in northern part of range; dry rocky sparsely wooded ridges or hillsides.	___	G4G5T1	SX	___	List: Grank (G4T1), VA SRank (SX).
X	_	*Phyciodes cocyta*	Northern crescent	Augusta, Bath Cos.	Shale barrens; bare rock/talus/scree; old fields; mixed conifer-hardwood forests.	___	G5	S1S3	S2	
X	_	*Speyeria atlantis*	Atlantis fritillary	Augusta, Highland Cos.	Canadian Life Zones; cool open woods; along woodland streams; upland pastures; clearings.	___	G5	S2	S2S3	
X	X	*Speyeria diana*	Diana fritillary	Blue Ridge, Ridge & Valley.	Grasslands-shrublands, near streams with thistles and milkweeds. Larval host plant, violets, *Viola* spp.	___	G3G4	S3	S2	
Skipper (Insects, Order Lepidoptera)										
X	X	*Euphyes bimacula*	Two-spotted skipper	Augusta, Highland, Montgomery Cos.	Bogs/fens; herbaceous wetlands; shrub wetlands.	___	G4	S2	S1	
Moth (Insects, Order Lepidoptera)										
_	X	*Anaplectoides brunneomedia*	Brown-lined dart moth	Grayson Highlands, Giles, Smyth Cos.	Mountains at high elevations.	___	G4	S2	SU	
_	X	*Catocala marmorata*	Marbled underwing	Montgomery Co.	Breeding: mainly riparian forest areas; mostly mature, mesic hardwood forests.	___	G3G4	S2	___	
X	X	*Catocala pretiosa pretiosa*	Precious underwing	Blue Ridge, Ridge and Valley.	Headwaters swamps; wet swales in pine barrens.	___	G4T2	SH	___	
X	_	*Psectrotarsia hebardi*	Hebard's noctuid moth	Bath Co.	Rich, mesic hardwood forest. Larvae host plant, Canada horse-balm, *Collinsonia canadensis*.	___	GU	SH	___	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
_	_	*Synanthedon castaneae*	Chestnut clearwing moth	No data.	Mixed hardwoods; Prefers Quercus and Castanea.	___	G3G5	SH	___	
Bee (Insect, Order Hymenoptera)										
_	_	*Bombus terricola*	Yellow-banded bumble bee	No data.	Select food plants: Vaccinium, Salix (Willows), Rosa (Roses), Rubus, Lonicera (Honeysuckles), Solidago (Goldenrods), Asters.	___	G3G4	SU	___	2016 VA-DCR/DNH, Rare Animals List: Grank (G2G4), VA SRank (SU).
NON-VASCULAR PLANTS										
Lichen										
X	_	*Arctoparmelia centrifuga*	Concentric ring lichen	Pendleton, Tucker Cos, WV.	High elevations. Arctic/boreal disjunct. Saxicolous (grows on rocks).	___	G5	S1	___	
X	_	*Buellia stellulata*	Button lichen	Blue Ridge; Shenandoah National Park.	Disjunct from the western US.	___	GNR	S1	___	Also called Disc lichen.
_	X	*Cetrelia monachorum*	Sea-storm lichen	Mt. Rogers, Grayson, Smyth Cos.	High elevation, spruce fir forests. Collected on Fagus.	___	G2G4	SU	___	List: Grank (G2G4), VA SRank (SH).
X	X	*Cladonia coccifera*	A cladonia	Blue Ridge; Shenandoah National Park.	Arctic/Boreal species disjunct in higher Appalachians. Found on soils and humus covered rocks in open woods.	___	G5	S1?	___	Also called Cup lichen.
_	X	*Hypotrachyna livid escens*	A loop lichen	Near Raven Cliff Karst Area, just southwest of Collins Cove Horse Camp; 2.1 mile south of intersection with Pope Rd.; along Cole Branch Drive, Washington Co.; Abrams Falls, NW of Bristol. Grayson, Wythe, Washington Cos.	No data.	___	GNR	S1	___	
X	_	*Melanelia stygia*	Alpine camouflage lichen	Pendleton Co, WV.	On exposed rocks in eastern Canada and New England southward in the mountains to TN.	___	G5	S3?	S2	Also called Stygian black-parmelia.
X	_	*Parmelia omphalodes*	Smoky crottle	Page Co.	No data.	___	G5	S2	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G2G4), VA SRank (S2?). Also called Smoky shield lichen.
X	X	*Peltigera hydrothyria*	Hydrothyria lichen	Augusta, Amherst, Alleghany, Bedford, Botetourt, Giles, Highland, Madison, Nelson, Rockbridge, Shenandoah, Smyth, Wythe Cos. VA.; Pendleton Co WV.	Aquatic - in streams/springs/cascades. Grows at or below water level in cool, clear, partially-shaded streams.	___	G4	S1	___	Synonym: *Hydrothyeria venosa*.
X	_	*Porpidia lowiana*	A boulder lichen	Blue Ridge; Shenandoah National Park.	Arctic / Boreal disjunct. Grows on acid rocks.	___	G2G3	S1	___	
X	_	*Porpidia tuberculosa*	A boulder lichen	Blue Ridge; Shenandoah National Park.	Arctic / Boreal disjunct. Grows on acidic rocks in the open.	___	G2G4	S1	___	
_	X	*Psilolechia clavulifera*	A lichen	Whitetop Mtn, Grayson, Smyth, Washington Cos.	No data.	___	GNR	___	___	2018 VA-DCR/DNH, Rare Plants List: Grank (GNR), VA SRank (S1).
X	_	*Punctelia semansiana*	Speckled shield lichen	Pendleton Co. WV.	No data.	___	GNR	S1	___	Synonym: *Punctelia graminicola.*
X	_	*Stereocaulon glaucescens*	Bony foam lichen	Blue Ridge; Shenandoah National Park; Pendleton Co, WV.	Grows on soil.	___	G4G5	S2?	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G3), VA SRank (S2?). Also called Snow lichen.
_	X	*Usnea angulata*	A beard lichen	0.28 mile SSE of Hale Spring and 6 mile SW of Nicklesville, along Copper Creek, Scott Co.	No data.	___	G3G5	___	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G3G5), VA SRank (S1).
Liverwort										
_	X	*Frullania oakesiana*	A liverwort	Mt Rogers & Whitetop Mtn.	Bark in spruce-fir forests.	___	G3?	S?	___	
_	X	*Metzgeria fruticulosa*	A liverwort	Whitetop Mtn.	Bark in spruce-fir forests, >5000'.	___	G2Q	S?	___	
_	X	*Lejeunea ruthii*	A liverwort	Amherst, Dickenson, Giles Cos.	Occurs most commonly in mixed mesophytic and Oak Hickory forests, but extend into Fraser Fir-Red Spruce climax forest.	___	G3G4	SU	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G3G4), VA SRank (S1).
_	X	*Plagiochasma rupestre*	A liverwort	Giles Co.	Sandstone outcrops in a partially shaded xeric mixed oak-hickory forest.	___	G5	___	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G5), VA SRank (S1).
Moss										
_	X	*Sphagnum angustifolium*	Narrowleaf peatmoss	Giles, Grayson Cos, VA; Greenbrier, Pocahontas Cos, WV	Above water level in open acid bogs; dry margins of open woodland fens.	___	G5	S1S2	S1	
_	X	*Sphagnum capillifolium*	Pom-pom peatmoss	Giles, Grayson, Smyth Cos, VA; Pocahontas Co, WV.	On moist humus and rocks in Spruce Fir forests; uncommon at lower elevations on rock exposures; heath mires and spray waterfalls.	___	G5	S1S2	___	Also called Northern peatmoss.
_	X	*Sphagnum fimbriatum*	A peatmoss	Smyth Co, VA; Pocahontas Co, WV.	Loose carpets along edges in open fens; margins of bogs; spring seeps; on rocks and wet depressions in Spruce Fir forests at high elevations.	___	G5	S3?	___	Also called Fringed bogmoss.
_	X	*Sphagnum flexuosum*	Flexuous Peatmoss	Giles Co. (Wythe Co record needs verification)	Shrub and graminoid bogs; margins of vegetation mats; high elevation Spruce Fir forests.	___	G5	S1S2	___	
_	X	*Sphagnum fuscum*	Brown peatmoss	Giles Co.	Short compact cushions along weak, poor fens.	___	G5	SH	___	
_	X	*Sphagnum girgensohnii*	Girgensohn's Peatmoss	Giles, Washington Cos, VA; Pocahontas Co, WV.	High elevation Spruce-Fir forests forming carpets on humus and large rocks; Possibly at waterfalls.	___	G5	S1S2	___	
_	X	*Sphagnum quinquefarium*	Five-rowed peatmoss	Carroll, Giles, Grayson, Page, Smyth Cos.	Sheltered seepage areas; wet dripping cliffs; sloping banks in mountains; peaty soil in swamps.	___	G5	S4S5	___	Also called Five-ranked bogmoss.
_	X	*Sphagnum rubellum*	Red peatmoss	Giles, Grayson , Smyth Cos, VA; Pocahontas WV.	Hummocks and small carpets in Spruce Fir forests.	___	G5	S2	___	
X	X	*Sphagnum russowii*	Russow's peatmoss	Giles, Grayson, Rockingham Cos.	Cushions and small mats at edges of heath bogs.	___	G5	S3	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G5), VA SRank (S2).
_	X	*Sphagnum subsecundum*	Subsecund peatmoss	Grayson, Tazwell Cos.	No data.	___	G5	S1	___	Also called Orange peatmoss.
_	X	*Sphagnum subtile*	Delicate peatmoss	Giles, Russell Cos, VA; Pocahontas Co, WV.	Small carpets in heath bogs and Spruce-Fir forests.	___	G5	S3	___	
VASCULAR PLANTS										
X	_	*Alnus incana ssp. rugosa*	Speckled alder	Augusta, Nelson, Page Cos.	Wet soil; Streambanks, seeps, seepage swamps.	___	G5T5	S2	S4	
X	_	*Anaphalis margaritacea*	Pearly everlasting	Augusta, Highland, Rockbridge Cos.	Various high elevation habitats, chiefly in dry, open areas.	___	G5	S1	S4	
X	_	*Anemone canadensis*	Canada anemone	Rockingham Co.	Along sandy shores, damp prairies, wet meadows.	___	G5	SH	S1	
X	X	*Anticlea glauca*	White camas	Scott Co, north to Page Co.	Dry calcareous woodlands, barrens and cliffs.	___	G5T4T5	S3	S1	Synonym: *Zigadenus elegans ssp. glaucus.*
_	X	*Arabis glabra*	Tower mustard	Craig, Montgomery, Smyth Cos.	Dry soil. Woodland borders, disturbed habitats.	___	G5	S1	S4	*Synonym: Turritis glabra.*
X	X	*Arabis pycnocarpa var. adpressipilis*	Hairy rockcress	Bland, Rockingham, Shenandoah, Wythe Cos.	Calcareous regions; Woods, hillsides, barrens, cliffs.	___	G5T4Q	S1S2	___	Synonym: *Arabis hirsuta var. adpressipilis.*
X	_	*Aralia hispida*	Bristly sarsaparilla	Augusta, Frederick, Highland, Page, Rockbridge, Shenandoah, Warren Cos.	Dry, usually rocky, woods, especially in sandy or sterile soil.	___	G5	S2	S4	
X	_	*Arethusa bulbosa*	Dragon's mouth	Augusta Co.	Boggy seepage wetlands, shrub swamps, sphagnous hummocks. At foot of western slope along the Blue Ridge.	___	G4	SH	___	
X	X	*Arnoglossum reniforme*	Great Indian-plantain	Alleghany, Amherst, Augusta, Bath, Craig, Dickenson, Shenandoah, Nelson, Gray, Smyth Cos.	Sandy, semi-open alluvial streambanks, often flood-scoured. Edge of young mixed hardwoods.	___	G4	S2	S3	Synonym: *Arnoglossum muehlenbergii.*
X	X	*Asplenium bradleyi*	Bradley's spleenwort	Botetourt, Dickenson, Giles, Rockingham Cos.	Crevices of dry, exposed or partly shaded cliffs and outcrops. Sandstone and felsic metasedimentary rocks.	___	G4	S2	SH	
X		*Astragalus distortus var. distortus*	Ozark milkvetch	Frederick, Shenandoah, Warren Cos.	Shale barrens, shale woodlands.	___	G5T5?	SH	S2	
X	X	*Baptisia australis var. australis*	Blue wild indigo	Augusta, Bedford, Frederick, Giles, Page, Rockingham, Rockbridge, Pulaski, Scott, Shenandoah Cos.	Woodland borders, open woods. Moist, usually rocky or gravelly soil.	___	G5T3T4	S3	S3	
X	_	*Betula papyrifera var. cordifolia*	Paper birch	Augusta, Highland, Page, Rockbridge, Rockingham Cos.	Acidic montain forests and boulderfields of moist or dry soil, usually associated with some presence of fire or other disturbance.	___	G5	S2	S1	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
_	X	*Botrychium lanceolatum var. angustisegmentum*	Triangle grape fern	Giles, Grayson Cos.	High elevation moist and shady forests, grassy balds, margins of swamps, meadows, bottoms, streambanks and sandy fields. Mostly subacid soils.	___	G5T4	SH	?	
X	X	*Botrychium simplex var. simplex*	Dwarf grape fern	Giles, Grayson, Page, Shenandoah Cos.	Mesic and dry-mesic forests.	___	G5T5	S1	SNR	
_	X	*Bromus ciliatus*	Fringed brome grass	Grayson, Highland Cos.	Seepage slopes, moist woods, other wet sites.	___	G5	S1	S4	
X	_	*Bromus kalmii*	Arctic brome	Augusta, Bath, Highland Cos.	In VA, small scattered colonies (2600'-3600') along sandstone ridge crests, noses of slopes in thin oak woods, openings.	___	G5	S1	S5	
X	X	*Calopogon tuberosus*	Tuberous grass-pink	Ridge and Valley; Blue Ridge; Shenandoah, Warren Cos south to Lee Co, west to Grayson Co.	Bogs, fens, seeps. Basic and acidic substrates.	___	G5	S2	S1	
X	X	*Camassia scilloides*	Wild hyacinth	Bath, Giles, Highland, Rockbridge, Scott, Smyth, Washington Cos.	Moist open woods, wet woods, thickets.	___	G4G5	S2	S4	
X	X	*Campanula rotundifolia*	Harebell	Giles, Rockbridge Cos.	Dry woods, barrens, cliffs, outcrops of calcareous substrates.	___	G5	S1	S2	
_	X	*Cardamine flagellifera*	Blue Ridge	Blue Ridge, Ridge & Valley, S of New R watershed.	Riparian, spring seeps, rocky streamsides.	___	G3	SH	S2	
X	_	*Carex aquatilis*	Aquatic sedge	Big Levels, Augusta Co.	Shallow water, wet soil, peat.	___	G5TNR	S1	S1	
X	_	*Carex arctata*	Black sedge	Highland Co.	Moist rich woods of hardwood and spruce.	___	G5	S1	S1	
_	X	*Carex barrattii*	Barratt's sedge	Augusta Co.	Sinkhole ponds.	___	G4	S2	___	
X	X	*Carex buxbaumii*	Brown bog sedge	Augusta, Bath, Giles, Nelson, Rockingham Cos.	Calcareous and mafic fens, peat-bogs, marshes, wet meadows, seeps.	___	G5	S2	S2	
X	X	*Carex conoidea*	Field sedge	Bath, Grayson, Highland, Washington Cos.	Calcareous and mafic fens, saturated meadows, old fields of calcareous substrates.	___	G5	S1S2	S1	
X	X	*Carex cristatella*	Crested sedge	Augusta, Bath, Bland, Giles, Grayson, Montgomery, Tazwell, Smyth, Washington Cos.	Low, calcareous wet meadows, open swamp areas, seeps.	___	G5	S1?	S4	
_	X	*Carex flava*	Yellow sedge	Dismal Creek, Giles Co.	Wet places in calcareous areas.	___	G5	S1	___	
X	X	*Carex interior*	Inland sedge	Augusta, Bland, Grayson, Highland, Montgomery, Washington Cos.	Calcareous seeps, fens, wet meadows.	___	G5	S1	S1	
X	_	*Carex lasiocarpa var. americana*	Slender sedge	Augusta Co.	Acidic, semipermanently flooded sinkhole pond.	___	G5T5	S1	S1	
_	X	*Carex lucorum var. austrolucorum*	Appalachian woodland sedge	Grayson , Lee, Scott, Smyth Cos.	Dry, open woods of oak, pine, or *Fagus.*	___	G4T3T5	S3	S1	
X	_	*Carex lupuliformis*	False hop sedge	Amherst Co.	Floodplain forest, ephemeral pools.	___	G4	S2	S2	
_	X	*Carex manhartii*	Blue Ridge purple sedge	Grayson, Smyth Cos.	High elevation northern hardwood forests.	___	G3G4	S1	S1	
_	X	*Carex oklahomensis*	Sooner sedge	Giles Co.	Calcareous meadows, seeps.	___	G4	SNA?	___	
X	_	*Carex ormostachya*	Necklace spike sedge	Augusta Co.	Northern hardwood forests.	___	G4	S1	S1	
_	X	*Carex pallescens*	Pale sedge	Wilburn Ridge, Mt. Rogers, Grayson Co.	Meadows, grassy woodland edges, glades.	___	G5	S1	___	
X	X	*Carex pedunculata var. pedunculata*	Longstalk sedge	Scott to Montgomery Cos.; Rockbridge to Rockingham Cos.	Rich woods to rocky bluffs, usually in calcareous to mafic soils.	___	G5TNR	S3	S2	
_	X	*Carex purpurifera*	Limestone purple sedge	Lee, Russell, Scott, Wise Cos.	Rich cove woods, dry calcareous woods.	___	G4?	S3	S1	
X	X	*Carex roanensis*	Roan Mountains sedge	Augusta, Smith, Tazwell, Wise, Washington Cos.	Dry-mesic, rocky, oak, oak-hickory and mixed hardwood forests. Middle to high elevations.	___	G2G3	S2	S1	
_	X	*Carex ruthii*	Ruth's sedge	Grayson, Smyth, Tazwell, Wise Cos.	High elevations: Bogs, seeps, streambanks, seepage swamps.	___	G3	S3	___	
X	X	*Carex tetanica*	Rigid sedge	Washington to Montgomery Cos; Allegheny, Augusta, Frederick, Highland, Shenandoah Cos.	Low woods, calcareous fens, spring marshes, meadows.	___	G4G5	S3	S1	
X	X	*Carex vesicaria*	Inflated sedge	Amherst, Botetourt, Bath, Craig, Grayson, Wythe Cos.	Wet soil or shallow water in bogs, swamps, marshes, depression ponds, streams, seeps, springs.	___	G5	S1S2	S2	
X	X	*Chenopodium foggii*	Fogg's goosefoot	Alleghany, Bath, Giles, Rockingham, Shenandoah Cos.	Dry, rocky open forests and woodlands. Shale or calcareous sandstones. Often among oak-hickory vegetation.	___	G2G3	S1?	___	
X	X	*Cheilanthes castanea*	Chestnut lip fern	Alleghany, Giles , Montgomery, Page, Pulaski, Rockbridge, Shenandoah, Wythe Cos.	Dry exposed outcrops, shales; Calcareous sedimentary and metamorphic substrates.	___	G5?	S2	S2	
_	X	*Cheilanthes eatonii*	Eaton's lipfern	Giles Co?	Calcareous or metamorphic substrates; Cliffs, in crevices, on shale or talus slopes.	___	G5?	S2	S2	Synonym: *Cheilanthes castanea.*
X	X	*Cirsium altissimum*	Tall thistle	Botetourt, Giles, Shenandoah Cos.	Forests, rich thickets, river-banks, woods, fields, clearings.	___	G5	S1	S4	
X	X	*Clematis catesbyana*	Satin-curls	Augusta, Giles, Lee, Russell, Smyth, Tazwell, Wise Cos.	Woodlands, outcrops, clearings and roadsides. Calcareous substrates.	___	G4G5	S1	___	
X	X	*Clematis occidentalis var. occidentalis*	Purple clematis	Allegheny, Augusta, Giles, Highland, Montgomery, Page, Shenandoah, Warren Cos.	High elevation forests, rock outcrops, clearings, roadsides.	___	G5T5	S2	S2	
_	X	*Collinsia verna*	Eastern blue-eyed Mary	Giles, Russell, Scott, Smyth, Washington Cos.	Rich sites. Moist woods, often along streams, especially in alluvial soil. Ocassionally in early successional habitats.	___	G5	S2	S4	
X	X	*Coreopsis verticillata*	Whorled coreopsis	Ridge and Valley; Wythe Co to Frederick Cos.	Dry sites. Upland woods, barrens, clearings,	___	G5	S4S5	S1	
X	_	*Cornus canadensis*	Bunchberry	Bath, Highland, Rockbridge Cos.	Damp, cool woods at high elevations.	___	G5	S1	S3	
X	X	*Cornus obliqua*	Silky dogwood	Botetourt, Frederick, Scott Cos.	Flood-scoured rocky river shores and outcrops.	___	G5	S1	S4	
X	X	*Cornus rugosa*	Roundleaf dogwood	Augusta, Craig, Giles, Highland, Rockbridge, Shenandoah Cos.	Rocky forests, boulderfields.	___	G5	S1	S1	
_	_	*Cornus stolonifera = Cornus sericea*	Red-osier dogwood	Botetourt Co.	Riverbanks, shores.	___	G5	S1	SNA	
X	X	*Crataegus calpodendron*	Pear hawthorn	Allegheny, Amherst, Page, Pulaski, Smyth, Wise Cos.	Basic or calcareous substrates: Open woods, thickets, usually along small rocky streams.	___	G5	S1	S1	
_	X	*Crataegus mollis var. mollis*	Downy hawthorn	Botetourt, Montgomery, Roanoke, Wise Cos.	Mesic to dry upland forests, clearings and old fields.	___	G5TNR	S1	SH	
X	X	*Crataegus pruinosa*	Prunose hawthorn	Ridge and Valley; Blue Ridge, except far southwest VA.	Thickets, fields, rocky ground. Middle elevations.	___	G5	SNA	S4	
X	X	*Crataegus succulenta var. succulenta*	Fleshy hawthorn	Alleghany, Craig, Highland, Montgomery, Wyth, Page, Smyth, Tazwell Cos.	Old fields, pastures, clearings, forest edges. Occasionally on forested slopes and ridges.	___	G4G5TNR	S1	SH	
X	_	*Crocanthemum bicknellii*	Plains frostweed	Augusta, Highland, Rockingham Cos.	Mafic to calcareous substrates. Dry rocky, sandy or argillaceous open woods, clearings, shales.	___	G5	S1	S1	Synonym: *Helianthemum bicknellii.*
X	_	*Crocanthemum propinquum*	Low frostweed	Augusta Co.	Dry open woodlands, outcrops, and barrens.	___	G4	S1	S1	Synonym: *Helianthemum propinquum.*
X	_	*Cuscuta cephalanthi*	Buttonbush dodder	Bath Co.	Alluvial swamps, wet clearings. Primarily on woody hosts. On herbacious *Asteraceae.*	___	G5	SH	___	
X	X	*Cuscuta coryli*	Hazel dodder	Augusta, Bath, Giles, Page, Rockingham, Russell, Warren Cos.	On various shrubs and herbs. Dry open forests, rocky woodlands and barrens.	___	G5?	S2?	SH	
X	X	*Cuscuta rostrata*	Beaked dodder	Bath, Buchanan, Giles, Highland, Rockbridge, Russell, Smyth, Tazwell, Washington Cos.	Herbacious hosts. High elevation forests and clearings in the mountains.	___	G4	S2	S2	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Cyperus dentatus*	Toothed flatsedge	Augusta Co.	Seasonal soils in sinkhole ponds.	___	G4	S1	SNR	
X	_	*Cyperus houghtonii*	Houghton's flatsedge	Page Co.	Exposed outcrops.	___	G4?	SH	S1	
X	X	*Cypripedium reginae*	Showy lady's-slipper	Giles, Page, Rockingham, Warren, Washington Cos.	Calcareous soils. Bogs, seeps, swamps, wet woods.	___	G4	S1	S1	
_	_	*Cystopteris tennesseensis*	Tennessee bladder fern	Pulaski, Montgomery Cos.	Mesic to xeric calcareous outcrops.	___	G5	S1	S3	
X	X	*Desmodium canadense*	Showy tick-trefoil	Augusta, Bland, Rockbridge, Russell, Washington Cos.	Calcareous substrates: Fens, wet meadows.	___	G5	S1	S4	
X	X	*Desmodium cuspidatum var. cuspidatum*	Toothed tick-trefoil	Ridge and Valley; Blue Ridge; Scott Co. to Augusta, Nelson Cos.	Dry forests, woodlands, barrens. Calcareous substrates.	___	G5T5?	S2	S4	
X	_	*Desmodium sessilifolium*	Sessile-leaf tick-trefoil	Augusta, Rockingham, Shenandoah Cos.	Dry to mesic woodlands, clearings, meadows.	___	G5	S2	___	
_	X	*Dichanthelium annulum*	Ringed panic grass	Craig, Giles, Lee Cos.	Dry open forests, woodlands, barrens, clearings. Rocky, sandy, hardpan soils. Usually over mafic or calcareous substrates.	___	G3G4	S2	___	
X	_	*Drymocallis arguta*	Tall cinquefoil	Northwest of Laurel Springs Gap, Augusta Co.; Nelson Co.	Dry, rocky woodlands over metabasalt.	___	G5	S1	SX	Synonym: *Potentilla arguta*.
X	X	*Eleocharis compressa var. compressa*	Flattened spikerush	Lee, Montgomery, Page, Warren Cos.	Riverside outcrops, seeps, depression ponds, swamps.	___	G4	S2	S2	
_	X	*Eleocharis intermedia*	Matted spikerush	Montgomery, Pulaski, Russell, Tazwell, Wythe Cos.	Calcareous fens, seeps, pools, depressions, ruts, other disturbed areas.	___	G5	S1	S1	
X	_	*Eleocharis melanocarpa*	Black-fruited spikerush	Maple Flats area, Augusta Co.; Rockingham Co.	Herb-dominated seasonal wetlands in limestone sink basins; Depression ponds.	___	G4	S2	___	
X	_	*Eleocharis robbinsii*	Robbins spikerush	Augusta Co.	Shallow ponds, dead-waters, peaty pools; Shenandoah sinkhole ponds.	___	G4G5	S1	___	
X	_	*Elymus canadensis var. canadensis*	Nodding wild rye	Giles, Rockbridge, Rockingham, Shenandoah Cos.	River banks, open ground, sandy soil.	___	G5TNR	S2?	S5	
X	X	*Elymus trachycaulus ssp. trachycaulus*	Slender wheatgrass	Ridge and Valley; Craig Co. north to Rockingham Co.	Limy soils, prairies, open soils.	___	G5T5	S2	S2	
X	X	*Epilobium ciliatum ssp. ciliatum*	American willow-herb	Ridge and Valley; Blue Ridge; Washington Co. to Shenadoah Co.	Bogs, seeps, wet meadows, wet clearings. High elevations.	___	G5T5	S2	S4	
X	X	*Epilobium leptophyllum*	Bog willow-herb	Bland, Giles, Grayson, Highland, Scott, Smyth, Washington Cos.	Circumneutral soils. High elevation bogs, wet meadows, seeps, other moist soils.	___	G5	S2	S3	
X	_	*Equisetum sylvaticum*	Woodland horsetail	Bath, Frederick, Shenandoah Cos.	Calcareous sites. Seeps, swamps, fens.	___	G5	S1	S1	
X	_	*Eriocaulon aquaticum*	Seven-angled pipewort	Augusta Co.	Peat mats, drawdown shores, ponds, other impoundments.	___	G5	S1	___	
_	X	*Eriocaulon decangulare var. decangulare*	Ten-angled pipewort	Grayson Co.	Bogs, boggy sphagnous clearings, mafic fens and seeps.	___	G3	S2	___	
X	_	*Erysimum capitatum var. capitatum*	Western wallflower	Alleghany, Bath Cos.	Open, dry often rocky, sandy banks and slopes. Open, shaly, southerly slopes below a sandstone scarp. Often on calcareous substrates.	___	G5T5	S2	S1	
_	X	*Fleischmannia incarnata*	Pink thoroughwort	Southwest VA.	Mesic to dry open forests. Calcareous and mafic substrates.	___	G5	S2	S3	Synonym: *Eupatorium incarnatum.*
X	X	*Eurybia radula*	Low rough aster	Bath, Craig, Giles, Page, Scott Cos.	Bogs, streambanks, fens, seeps and other moist places of various soil types.	___	G5	S1	S4	Synonym: *Aster radula.*
_	X	*Eurybia surculosa*	Creeping aster	Oak woods near Flatwoods Job Corps Center, Wise Co; Lee, Pulaski, Scott Cos.	Rocky, usually open, woodland habitats in the mountains. Sandy soils.	___	G4G5	S1	___	Synonym: *Aster surculosus.*
X	X	*Eutrochium maculatum var. maculatum*	Spotted Joe-pye weed	Augusta, Bedford, Craig, Frederick, Highland, Montgomery Cos.	Damp thickets, meadows, spring marshes. Usually in rich or calcareous soils.	___	G5T5	S2	S1	Synonym: *Eupatorium maculatum.*
_	X	*Fimbristylis puberula var. puberula*	Hairy fimbry	Grayson Co.	Mafic fens, wet meadows, wet flatwoods.	___	G5T5?	S1	SNR	
X	X	*Fragaria vesca var. americana*	Woodland strawberry	Bland, Highland, Washington, Wythe, Smyth, Cos.	Dry rocky woodlands, boulder fields, clearings.	___	G5T5	S2?	SNA	
_	X	Gentiana austromontana	Appalachian gentian	Mt Rogers, Whitetop Mtn, High Knob.	High elevation forests and grassy balds.	___	G3	S3	S1	
X	X	*Gentiana linearis*	Narrow-leaf gentian	Ridge and Valley.	Open grassy areas, wet woods, and meadows.	___	G4G5	___	S2	
_	X	*Gentianopsis crinita*	Greater fringed gentian	Bland, Montgomery Cos.	Low woods, wet meadows, brook banks. Calcareous substrates.	___	G5	S1	S1	
X	_	*Geranium robertianum*	Herb Robert	Highland, Page Cos.	Rocky woods on limestone outcrops, boulder fields, roadsides.	___	G5	S3	S2	
X	_	*Geum aleppicum*	Yellow avens	Rockingham Co.	Thickets, meadows, clearings.	___	G5	SH	S1	
X	X	*Glyceria acutiflora*	Sharp-scaled mannagrass	Ridge and Valley; Blue Ridge; Frederick Co. to Wythe Cos.	Depression ponds.	___	G5	S3	S2	
X	X	*Glyceria grandis var. grandis*	American mannagrass	Grayson, Highland Cos.	Banks of streams, wet meadows, ditches. nHigh elevations.	___	G5T5	S1	S2	
X	_	*Pseudognaphalium macounii*	Clammy everlasting	Highland Co.	Dry fields, clearings, pastures, borders of woods.	___	G5	S1	S2	Synonym: *Gnaphalium macounii.*
X	X	*Gnaphalium uliginosum*	Low cudweed	Grayson, Highland, Page, Rockingham Cos.	Ephemeral pools, depressions, ditches, damp clearings, waste places. High elevations.	___	G5	S1	S4	
X	X	*Goodyera repens*	Dwarf rattlesnake-plantain	Ridge and Valley; Blue Ridge; Rockingham C.o to Wise Cos.	Cove and hemlock forests, usually in mossy substrates.	___	G5	S2?	S1S2	
_	X	*Hasteola suaveolens*	Sweet-scented Indian-plantain	Giles, Montgomery, Pulaski Cos.	Riverbanks, wet meadows.	___	G4	S2	S3	
X	X	*Helianthus laevigatus*	Smooth sunflower	Ridge and Valley; Wythe Co. north to Shenandoah Co.	Dry open forests, rocky woodlands, barrens, clearings, road banks.	___	G4	S4	S2	
X	X	*Heuchera hispida*	Purple alumroot	Ridge and Valley, Blue Ridge.	Rocky woods, outcrops, open woods over limestone.	___	G3?	S3?	S2	Synonym: *Heuchera americana var. hispida.*
_	X	*Heuchera longiflora*	Long-flowered alumroot	Far southwest VA.	Upland woods, hillsides, shales, rich woods on limestone substrate; open or shaded areas.	___	G4	S4	S2	
X	X	*Hexalectris spicata var. spicata*	Crested coralroot	Ridge and Valley; Blue Ridge.	Rocky woods, woodland stream margins. Circumneutral, or calcareous soils.	___	G5	S3	S1	
_	X	*Hexastylis contracta*	Mountain heartleaf	Washington Co; Cumberland Plateau, TN; Blue Ridge Mtns, NC.	Mesic cove forests. Acidic substrates.	___	G3	S1	___	
_	_	*Hexastylis lewisii*	Lewis's heartleaf	Piedmont and Coastal Plain.	Upland woods, ravines, streambanks, bog edges, seepage swamps.	___	G3	S3	___	*Synonym: Hexastylis shuttleworthii.*
_	X	*Houstonia canadensis*	Canada bluets	Giles, Lee, Pulaski, Scott, Washington, Wise, Wythe Cos.	Woodlands, openings, rocky woods, hillsides of calcareous substrates.	___	G4G5	S2	S4	
X	X	*Huperzia appressa*	Appalachian fir clubmoss	Mt Rogers, Grayson Co.; Washington, Smyth, Page Cos.	Damp or mossy rocks, barrens, exposed outcrops, sheltered ledges, cold woods, bare mountains, seeps or along banks of small streams at high elevations.	___	G4G5	S2	___	Synonym: *Huperzia appalachiana.*
X	_	*Hypericum boreale*	Northern St. John's-wort	Rockbridge Co. to Rockingham Cos.	Damp peat, sand, shallow water.	___	G5	S2	S4	
X	X	*Hypericum fraseri*	Fraser's marsh St. John's-wort	Alleghany Co north to Highland Co; Giles Co.	Bogs, seeps, swamps, depression ponds.	___	G5	S2	S4	*Synonym: Triadenum fraseri.*
_	X	*Hypericum drummondii*	Drummond's St. John's-wort	Lee, Smyth, Washington Cos.	Dry fields, woods, roadsides, barrens.	___	G5	S3	S1	
X		*Hypericum ellipticum*	Pale St. John's-wort	Alleghany Mountain, Highland Co.	Damp sandy or gravelly shores, wet places.	___	G5	SH	S4	
X	X	*Hypericum mitchellianum*	Blue Ridge St. John's wort	Blue Ridge, Ridge & Valley.	Grassy balds, forest seepages. Moderate to high elevations.	___	G3	S3	S1	
X	X	*Iliamna remota*	Kankakee globe-mallow	Alleghany, Botetourt, Rockbridge, Bedford Cos.	Open, disturbed riverbanks and roadsides.	___	G1Q	S1	___	
X	_	*Isoetes lacustris*	Lake quillwort	Passage Creek, Shenandoah Co.	Gravely shoals in streams. Slow water.	___	G5	S1?	___	
X	_	*Isoetes virginica*	Virginia quillwort	Augusta Co.	Summer-dry sinkhole ponds, seasonally wet upland depressions, and small, wet-weather drains, especially in moss hummocks.	E	G1	S1	___	
_	X	*Juncus articulatus*	Jointed rush	Wise Co. to Bland, Buchanan, Montgomery Cos. to Craig, Highland Cos.	Wet meadows, seeps, gravel bars and shores.	___	G5	S1S2	S2	

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X	X	*Juncus brachycephalus*	Small-head rush	Ridge and Valley.	Calcareous fens and seeps.	___	G5	S2	___	
X	X	*Juncus brevicaudatus*	Narrow-panicled rush	Ridge and Valley.	Muddy, or wet places such as bogs and seeps. High elevations.	___	G5	S2	S4	
X	X	*Juniperus communis var. depressa*	Ground juniper	Bath, Grayson, Highland, Rockingham Cos.	Old fields, rock outcrops. Dry soils.	___	G5T5	S1	S2	Synonym: *Juniperus communis.*
X	_	*Lachnanthes caroliniana*	Redroot	Augusta Co.	Peaty shores of natural ponds.	___	G4	SH	___	
_	X	*Leucothoe fontanesiana*	Highland dog-hobble	Bland, Lee, Scott Cos.	Cove forests. Gentle slopes in open deciduous hardwoods.	___	G5	S1S2	___	
X		*Linum lewisii*	Prairie flax	Hardy, Pochahontos Cos, WV.	Prairies, calcareous rocky banks.	___	G5	___	S2	
X	X	*Linum sulcatum*	Grooved yellow flax	Ridge and Valley, Blue Ridge; Lee, Russell, Pulaski Cos. to Warren Co.	Shale barrens, dry rocky woodlands, clearings.	___	G5	S3	S1	
X	X	*Liparis loeselii*	Bog twayblade	Ridge and Valley, Blue Ridge; Dismal Ck, Giles Co.	Damp or wet woods, bogs, fens, seeps, swamps, wet meadows of calcareous substrate.	___	G5	S2	S3	
X	X	*Lithospermum latifolium*	American gromwell	Ridge and Valley; Blue Ridge.	Mesic to dry forests of calcareous substrate.	___	G4	S3	S4	
X	X	*Lithospermum virginianum*	Virginia false-gromwell	Ridge and Valley; Blue Ridge; Roanoke Co. to Augusta Co.	Dry sandy woods, barrens.	___	G4	S2	___	Synonym: *Onosmodium virginianum.*
X	_	*Lonicera canadensis*	American fly-honeysuckle	Highland, Page, Rockbridge, Shenandoah Cos	Moist northern hardwoods and bogs at high elevations, seeps and dry or moist, swamps.	___	G5	S3	S2	
X	X	*Lycopodiella inundata*	Northern Bog clubmossb	Bath, Giles, Highland, Rockingham Cos. to Rockbridge Cos.	Damp peaty or sandy shores, bogs, seeps, swamps, pond edges.	___	G5	S1	S2?	
X	_	*Lycopodiella margueritae*	Marguerite's clubmoss	Bath Co.	Seasonally moist soils, wet acidic ditches, borrow pits.	___	G2	NA	___	
X	_	*Lysimachia radicans*	Trailing loosestrife	Augusta Co.	Wet woods, bottomlands, swamps.	___	G4G5	SH	___	
X	X	*Lythrum alatum*	Winged loosestrife	Augusta, Rockbridge, Warren, Washington Cos.	Calcareous fens, swamps, meadows, prairies, ditches.	___	G5	S2	S2	
_	X	*Magnolia macrophylla*	Bigleaf magnolia	Lee Co.	Mesic, calcareous forests.	___	G5	S1	SNR	
X	X	*Maianthemum stellatum*	Stary Solomon's plume	Ridge and Valley; Russell Co. to Frederick, Warren Cos.	Riverside sand and rockbars, fens, seepage swamps, floodplane forests.	___	G5	S2	S2	
X	X	*Melica nitens*	Three-flower Melic Grass	Ridge and Valley.	Rocky woods, bluffs, dry clearings. Calcareous substrates.	___	G5	S1S2	S1	
_	X	*Micranthes careyana*	Carey's saxifrage	Scott Co.	Sheltered seeps on rock faces.	___	G3	S1	S3	Synonym: *Saxifraga careyana.*
_	X	*Micranthes caroliniana*	Carolina saxifrage	Blue Ridge, Ridge & Valley, S of New R.	Moist, shaded rocks and cliffs.	___	G3	S3	S1	
X	X	*Micranthes pensylvanica*	Swamp saxifrage	Ridge and Valley, Blue Ridge; Botetourt Co. to Warren Cos.; Grayson, Giles Cos.	Forested seeps, seepage swamps. Calcareous mafic substrates.	___	G5	S3S4	S2	Synonym: *Saxifraga pensylvanica.*
X	X	*Minuartia groenlandica*	Mountain sandwort	Spy Rock, Nelson Co.; Lee Co.	Granitic ledges, gravel. High elevations.	___	G5	S1	S1	
X	X	*Muhlenbergia glomerata*	Marsh muhly	Augusta, Grayson, Page, Rockbridge Cos.	Rocky woodlands, barrens, bogs, fens, seeps, marshes, wet meadows. Mafic and ultramafic substrates.	___	G5	S2	SNR	
X	_	*Oryzopsis asperifolia*	Rough-leaved ricegrass	Rockingham Co.	High elevation pine oak heathlands, sandy clearings.	___	G5	S1	S1	
X	_	*Osmundastrum cinnamomeum var. glandulosum*	Glandular cinnamon fern	Blue Ridge; Page Co.	A range of wet habitats from swamps and bogs to high elevation hardwood forests.	___	G5T?	S1	SNR	Synonym: *Osmunda cinnamomea var. glandulosa.*
_	X	*Osmunda x ruggii*	Interrupted royal fern	Single occurrence, Dicks Ck watershed, Craig Co.	Mesic, forested mountainside ravine.	___	GNR	SNR	___	
X	_	*Panicum hemitomon*	Maidencane	Augusta Co.	Swamps, ponds, ditches, marshes, pools, depression ponds.	___	G5?	S2	___	
X	X	*Parnassia grandifolia*	Large-leaved grass-of-parnassus	Augusta Co., Montgomery Co.	Neutral to basic thinly wooded gravely seeps, wet, calcareous soil, fens, bogs, meadows, bases of dripping cliffs.	___	G3	S2	S1	
X	X	*Paronychia virginica var. virginica*	Yellow nailwort	Alleghany, Botetourt, Giles, Wythe Cos.	Rocky places, crevices and ledges, shale barrensand cliffs of calcareous substrates.	___	G4T1Q	S1	S1	
X	X	*Patis racemosa*	Black-seed ricegrass	Ridge and Valley, Blue Ridge.	Rich cove forests.	___	G5	S4	S2	Synonym: *Oryzopsis racemosa.*
X	_	*Penstemon hirsutus*	Hairy beardtoungue	Frederick Co.	Dry rocky woods, clearings, fields of calcareous substrates.	___	G4	S3	S4	
_	X	*Phacelia fimbriata*	Fringed scorpion-weed	Grayson, Smyth, Washington Cos.	Norther hardwoods, cove, alluvial forests.	___	G4	S2	___	
X	X	*Phlox amplifolia*	Large-leaf phlox	Ridge and Valley; Alleghany Co.	Mesic woodlands, hardwood forests of calcareous substrates.	___	G3G5	S2	___	
X	X	*Poa palustris*	Fowl bluegrass	Ridge and Valley, Blue Ridge; Giles Co. north to Augusta Co.	Meadows, rocky shores, marshes of calcareous substrate.	___	G5	S1S2	S4	
X	X	*Poa saltuensis*	Drooping bluegrass	Augusta, Highland, Rockbridge Cos.	Open woods, thickets, recent clearings; northern hardwoods. > 4000'.	___	G5	S2	S1	
X	X	*Polanisia dodecandra var. dodecandra*	Common clammy-weed	Alleghany, Botetourt, Amherst Cos.	Sandy, or gravelly places, especially along the James R.	___	G5T5?	S2	SNA	Synonym: *Polanisia dodecandra.*
X	_	*Potamogeton oakesianus*	Oakes pondweed	Augusta, Rockingham Cos.	Shallow, acidic water along the edges of sinkhole ponds.	___	G4	S2	SH	
_	X	*Prenanthes roanensis*	Roan Mountain rattlesnake-root	Mt Rogers & Whitetop Mtn.	Grassy balds, open high elevation forests and outcrops.	___	G3	S3	___	
_	X	*Prosartes maculata*	Spotted mandarin	Smyth, Tazwell Cos., southwest to Lee Co.	Rich, mesic cove and slope forests, often over calcareous substrates.	___	G3G4	S3	S1	
X	X	*Prunus alleghaniensis var. alleghaniensis*	Alleghany sloe	Ridge and Valley, Blue Ridge; Pulaski Co. to Warren Co.	Clacareous and mafic substrates. Dry uplands, thickets, borders of woods, barrens, rocky woods.	___	G4T4	S3	S3	Synonym: *Prunus alleghaniensis.*
X	X	*Prunus nigra*	Canada plum	Ridge and Valley, Blue Ridge; Montgomery Co. to Warren Co.	Borders of woods, fencerows, old fields.	___	G4G5	S1?	___	
X	_	*Pyrola chlorantha*	Greenish pyrola	Page Co.	Dry, coniferous woods.	___	G5	SH	SH	
X	X	*Pyrola elliptica*	Shinleaf	Tazwell Co. to Shenandoah Cos.	Dry to moist woods, northern red oak and spruce forests.	___	G5	S2	S4	
X	_	*Ranunculus trichophyllus*	White water crowfoot	Hardy Co, WV.	Fresh to brackish waters.	___	G5	SNR	SH	
_	X	*Rhododendron arborescens*	Sweet azalea	Giles, Grayson Cos; Guest River Gorge, Wise Co.	Rocky forests, outcrops, banks of rivers, high gradient streams.	___	G4G5	S2	S4	
_	X	*Rhododendron cumberlandense*	Cumberland azalea	Southern Ridge and Valley.	Montane woodlands, balds, moist exposed slopes, rock outcrops.	___	G4?	S3	SNR	
X	_	*Ribes americanum*	Wild black currant	Rockbridge, Shenandoah Cos.	Stream banks, swamps, calcareous marshes.	___	G5	S1	S4	
X	_	*Ribes lacustre*	Bristly black currant	Pocahantos Co, WV.	Cold woods, swamps.	___	G5	___	S2	
X	X	*Rosa setigera*	Climbing prairie rose	Ridge and Valley; Amherst, Highland, Lee, Montgomery, Scott, Warren Cos.	Open woods, clearings, pastures, fields.	___	G5	S1	S3	
X	_	*Rubus idaeus var. strigosus*	Redraspberry	Ridge and Valley, Blue Ridge; Bath Co to Page Co.	Rocky woods, boulderfields, woodland edges, clearings.	___	G5T5	S2	S4	
_	X	*Rudbeckia triloba var. pinnatiloba*	Pinnate-lobed coneflower	Giles, Montgomery, Smyth, Wise Cos.	Dry calcareous soil of open woods and roadsides.	___	G5T3	S1	___	
X	X	*Ruellia purshiana*	Pursh's wild-petunia	Ridge and Valley, Blue Ridge; Lee Co to Frederick Co.	Dry forests, rocky woodlands, barrens. Calcareous and mafic substrates.	___	G3	S3		
X	X	*Sabatia campanulata*	Slender marsh-pink	Augusta, Grayson Cos.	Bogs, seeps, fens, depression ponds, power line strips, damp sands.	___	G5	S2	___	
_	X	*Sagittaria calycina*	Long-lobed arrowhead	Lee Co.	Mud flats, ponds, seasonally wet pools.	___	G5	S1	S2	Synonym: *Sagittaria calycina var calycina.*
X	X	*Sagittaria rigida*	Sessile-fruited arrowhead	Augusta, Frederick, Giles, Nelson, Page, Pulaski, Rockbridge Cos.	Natural, montane ponds, meadows.	___	G5	S1	SNA	
X	X	*Sanicula trifoliata*	Large-fruited sanicle	Ridge and Valley, Blue Ridge; Scott Co to Shenandoah Co.	Rich cove and slope forests, northern hardwood forests, dry-mesic oak-hickory forests.	___	G4	S4	S5	
_	X	*Sceptridium jenmanii*	Alabama grapefern	Scott, Russell, Wise Cos.	Open woods, old fields, pastures.	___	G3G4	SH	___	Synonym: *Botrychium alabamense.*

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Schizachne purpurascens*	Purple oat grass	Highland Co.	Northern hardwood forests, Spruce-Fir forests, old fields, clearings.	___	G5	S1	S1	
X	_	*Schoenoplectus subterminalis*	Water bulrush	Augusta Co.	Acid waters, sinkhole ponds, quaking bogs, peaty shores.	___	G4G5	S1S2	___	
X	_	*Schoenoplectus torreyi*	Torrey's bulrush	Augusta, Rockingham Cos.	Shallow water in peaty soils of Shenandoah Valley sinkhole ponds.	___	G5?	S1	S1	
X	X	*Scutellaria ovata ssp. rugosa*	Heart-leaf skullcap	Ridge and Valley; Giles, Montgomery Cos to Bath, Rockbridge Cos; Ridge and Valley in WV.	Calcareous woodlands, barrens; Shale, metabasalt substrates.	___	G5THQ	SNA	SNR	Synonym: *Scutellaria ovata ssp. pseudoarguta.*
X	X	*Scutellaria leonardii*	Small skullcap	Ridge and Valley; Frederick Co south to Lee Co.	Barrens, outcrops, grass balds at high elevations. Mafic to felsic substrates.	___	G4T4	S4	S2	Synonym: *Scutellaria parvula.*
X	X	*Sibbaldia tridentata*	Three-toothed cinquefoil	Grayson, Page, Rockingham, Smyth, Washington Cos.	High elevation barrens, outcrops and grassy balds.	___	G5	S2	S2	Synonym: *Sibbaldiopsis tridentata.*
X	X	*Sida hermaphrodita*	Virginia mallow	Ridge & Valley, James R watersheds.	Riverbank glades with loose rock or sandy soil.	___	G3	S1	S3	
_	X	*Silene rotundifolia*	Round-leaf catchfly	Dickenson, Lee, Wise Cos.	Shaded banks, exposed cliffs, rocky ledges and slopes, sandstone cliffs, talus.	___	G4	S2	S1	
X	_	*Solidago rupestris*	Riverbank goldenrod	Page Co.	Rocky riverbanks, openings, cliffs, prairies.	___	G4?	S1	___	
X	_	*Solidago randii*	Rand's goldenrod	Blue Ridge; Warren Co. to Amherst Co.	Primarily over mafic rock. High elevation cliffs, barrens.	___	G4	S2S3	S1	Synonym: *Solidago simplex var. randii.*
X	X	*Solidago rigida var. rigida*	Stiff goldenrod	Ridge and Valley.	Dry rocky woods, barrens, outcrops, clearings, fields with prairie affinities.	___	G5T5	S2	S1	Synonym: *Oligoneuron rigidum.*
X	X	*Solidago uliginosa var. uliginosa*	Bog goldenrod	Grayson, Highland Cos.	Bogs meadows, fens, glades.	___	G4G5T4T5	S2	S4	Synonym: *Solidago uliginosa.*
X	X	*Sparganium emersum*	Narrow-leaf burreed	Bath, Frederick, Giles, Highland, Russell, Washington Cos.	Bogs, beaver wetlands, calcareous marshes. ≥2500'.	___	G5	S1	___	Synonym: *Sparganium chlorocarpum.*
X	X	*Spartina pectinata*	Freshwater cordgrass	Augusta, Bland, Dickenson, Giles, Rockbridge, Wise, Wythe Cos.	Rocky riverbanks, wet meadows, wet open streambanks, swamps, calcareous fens.	___	G5	S2	S4	
X	X	*Spermacoce glabra*	False smooth buttonweed	Bedford, Botetourt Cos.	Rocky river shores.	___	G4G5	S1	S1	
X	X	*Spiranthes lucida*	Shining ladies'-tresses	Ridge and Valley; Washington Co north to Frederick Co.	Calcareous fens and seeps, moist banks, damp meadows.	___	G5	S1	S1S2	
X	X	*Spiranthes ochroleuca*	Yellow nodding ladies'-tresses	Ridge and Valley, Blue Ridge; Warren Co south to Scott Co.	Bogs, meadows, swamps, marshes, wet woods, edge of lakes and streams, peaty and gravelly soil in open barrens, on seepages slopes, forests clearings, meadows. High elevations.	___	G4	S2	S5	
X	X	*Sporobolus neglectus*	Small dropseed	Ridge and Valley, Blue Ridge; Lee Co north to Page Co.	Dry, sterile or sandy soil, mostly open areas. Limestone barrens, cliffs and rocky fields.	___	G5	S2	SNR	
	X	*Stylophorum diphyllum*	Celandine poppy	Ridge and Valley; Roanoke Co south to Lee Co.	Rich woods, often calcareous, cove forests.	___	G5	S2	S4	
X	X	*Symphoricarpos albus*	Common snowberry	Russell Co north to Shenandoah Co	Calcareous ledges, barrens and gravels. Rocky woods and fields.	___	G5T5	S1	S2	
X	X	*Symphyotrichum x schistosum*	Millboro aster	Ridge and Valley. James R drainage, Cowpasture R. Widespread. Occupies all major hydrographic subdivisions of Potomac drainage, except those on lower Piedmont and Coastal Plain. Avoids the Blue Ridge, to which it has ready access.	Shale barrens.	___	GNA	SNA	___	Synonym: *Aster schistosus.*
_	X	*Synandra hispidula*	Gyandotte beauty	Far southwest VA, north to Tazewell Co.	Rich mesic wooded slopes, limestone. Requires permanently moist soil over siltstone, sandstone.	___	G4	S2	S2	
X	X	*Taenidia montana*	Mountain pimpernel	Ridge and Valley, Blue Ridge; Craig, Roanoke, Bedford Cos north to Frederick Co.	Dry woodlands, barrens, outcrops. Open rocky forests. Shale and calcareous sandstone.	___	G3	S3	S3	
X	_	*Triantha racemosa*	Coastal false asphodel	Augusta Co.	Wet sand, clay, bogs.	___	G5	SH	___	*Synonym: Tofieldia racemosa.*
X	X	*Trichostema setaceum*	Narrow-leaf blue curls	Washington, Rockbridge, Bath, Page, Shenandoah, Warren Cos.	Sandstone barrens and outcrops.	___	G5	S2	S2	
X	_	*Trillium pusillum var. moniticulum*	Virginia least trillium	Great North Mtn & Shenandoah Mtn, VA and WV.	Open oak woodlands in well-drained soil and margins of thickets.	___	G3T2	S2	S1	
X	X	*Triphora trianthophora ssp. Trianthophora*	Nodding pogonia	Washington, Grayson Cos north to Rockingham Co.	Damp rich woods, often on rotten logs.	___	G3G4T3T4	S1	S2	
X	X	*Vaccinium macrocarpon*	Cranberry	Augusta, Giles, Grayson Cos.	Open bogs and ponds. Mostly high elevations.	___	G4	S2	S2	
X	_	*Verbena scabra*	Rough vervain	Rockingham Co north to Shenandoah Co.	Swamps, rich low woods and shores.	___	G5	S2	S1	
X	X	*Veronica scutellata*	Marsh speedwell	Augusta, Bath, Grayson Cos.	Bogs, fens, seeps. Calcareous substrates.	___	G5	S1	S2	
X	X	*Viburnum lentago*	Nannyberry	Augusta, Giles, Highland, Page Cos.	Banks of streams, seeps, old fields.	___	G5	S1	S1S2	
X	X	*Vicia americana var. americana*	American purple vetch	Ridge and Valley, Blue Ridge; Washington Co north to Rockingham Co.	Dry shale woodlands, forest edges, clearings, prairies.	___	G5T5	S1S2	S4	
_	X	*Viola walteri var. walteri*	Prostrate blue violet	Botetourt Co south to Russell Co.	Dry woods, rocky ledges, slopes. Calcareous substrates.	___	G4G5TNR	S2	SNR	
X	X	*Woodwardia virginica*	Virginia chain fern	Botetourt, Augusta, Rockingham Cos.	Acid bogs, swamps, wooded bottoms, sinkhole and depression ponds.	___	G5	S5	SNR	

Documentation of Threatened, Endangered or Sensitive Species Occurrences for (PROJECT NAME)
Coding for Occurrence Analysis Results (OAR) for 199 species

Forest updated November 26, 2018 (based on Region 8 sensitive species list effective March 15, 2018)

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
VERTEBRATE										
Fish										
	-	X	*Ammocrypta clara*	Western sand darter	Clinch R, Powell R	Aquatic-rivers.	S	G3	S1	-
	-	X	*Chrosomus cumberlandensis*	Blackside dace	Upper Cumberland R, Upper Powell R, Poor Fk Cumberland R, Clinch R drainage - Staunton Ck McGhee Ck	Aquatic-streams.	T	G2	S1	S3 (KY)
	-	X	*Erimonax monachus*	Spotfin chub	Lower N Fk Holston R	Aquatic-streams.	T	G2	S1	-
	-	X	*Erimystax cahni*	Slender chub	Two sites - Powell R, Lee Co	Aquatic-rivers.	T	G1	S1	-
	-	X	*Erimystax insignis*	Blotched chub	Clinch-Powell system, S Fk Holston R	Aquatic-streams/rivers.	S	G4	S3	-
	-	X	*Etheostoma acuticeps*	Sharphead darter	S and Middle Fk Holston R	Aquatic-rivers.	S	G3	S1	-
	-	X	*Etheostoma cinereum*	Ashy Darter	Upper Clinch R, Guest R gorge	Aquatic-rivers.	S	G2G3	S1	-
	-	X	*Etheostoma osburni*	Candy darter	Big Stony Ck, Dismal Creek, Cripple Creek (New R watershed)	Aquatic-streams.	E	G3	S1	S2
	-	X	*Etheostoma percnurum*	Duskytail darter	Copper Ck, Clinch R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Etheostoma denoncourti*	Golden darter	Four sites Clinch R, lower Copper Ck.	Aquatic-rivers. Formerly: Tippecanoe darter, *Etheostoma tippecanoe.*	S	G3G4	S1	S2
	-	X	*Etheostoma vulneratum*	Wounded darter	N & S Fk Holston R, Clinch R, Powell R.	Aquatic-Rivers.	S	G3	S2S3	-
	-	X	*Icthyomyzon greeleyi*	Mountain brook lamprey	M, N Fk Holston R, Copper Ck, Indian Ck, Clinch R, Powell R	Aquatic-rivers.	S	G3G4	S2	S1
	-	X	*Notropis ariommus*	Popeye shiner	N Fk Holston R, Clinch R, Powell R	Aquatic-rivers.	S	G3	S2S3	S2
	X	X	*Notropis semperasper*	Roughhead shiner	Upper James R watershed above Buchanan (Cowpasture R, Jackson R, Craig Ck)	Aquatic-rivers.	S	G2G3	S2S3	-
	-	X	*Noturus flavipinnis*	Yellowfin madtom	Lower & Mid reaches of Copper Ck, Powell R	Aquatic-streams.	T	G1	S1	-
	X	X	*Noturus gilberti*	Orangefin madtom	S Fk Roanoke R watershed, Roanoke R above Salem, Craig Ck, Johns Ck, Cowpasture R	Aquatic-streams.	S	G2	S2	-
	-	X	*Percina burtoni*	Blotchside logperch	N Fk Holston R, Clinch R, Copper Ck, Little R	Aquatic-rivers.	S	G2G3	S1	-
	-	X	Percina rex	Roanoke logperch	Upper Roanoke R watershed	Aquatic-rivers.	E	G1G2	S1S2	-
	-	X	*Percina williamsi*	Sickle darter	S & N Fk Holston R above Saltville, Clinch R - lower Copper Ck.	Aquatic-rivers. Formerly: *Percina macrocephala*.	S	G2	S1S2	S2
	-	X	*Phenacobius teretulus*	Kanawha minnow	Upper New R watershed	Aquatic-streams.	S	G3G4	S2S3	S1
Amphibian										
	-	X	*Aneides aeneus*	Green salamander	Bland, Dickenson (Skegg Boulderfield), Lee, Russell, Scott, Tazewell, Washington, Wise, Wythe Cos VA; Greenbrier, Monroe, Pendleton Cos WV	Damp (not wet) crevices in shaded rock outcrops and ledges; beneath loose bark; in cracks of standing or fallen trees; in or under logs on ground.	S	G3G4	S3	S3
	-	X	*Cryptobranchus alleganiensis*	Hellbender	N & S Fk Holston (Whitetop Laurel), Clinch R, Copper Ck, Powell R.	Aquatic-rivers, streams.	S	G3G4	S2S3	S2
	-	X	*Desmognathus organi*	Northern pygmy salamander	Grayson, Smyth, Washington Cos. Whitetop Mt. and Mt. Rogers	Spruce-fir forests and adjacent northern hardwoods, >3600'	S	G3	S2	-
	-	X	*Plethodon hubrichti*	Peaks of Otter salamander	Peaks of Otter, Apple Orchard Mtn	Mixed oak, late successional with loose rocks and logs, >1800'.	S	G2	S2	-
	X	-	*Plethodon punctatus*	Cow Knob salamander	Shenandoah Mtn, VA & WV	Mixed oak, late successional with loose rocks and logs, >2500'.	S	G3	S2	S1
	X	-	*Plethodon sherando*	Big Levels salamander	Big Levels, Augusta Co	Forest and rocky talas slopes 1900' – 3580'.	S	G2	S2	-
	X	-	*Plethodon virginia*	Shenandoah Mountain salamander	Rockingham Co	Temperate forests between 3600' – 3900'.	S	G2G3	S2	SNR
	-	X	*Plethodon welleri*	Weller's salamander	Mt Rogers & Whitetop Mtn	Spruce-fir forests and adjacent northern hardwoods.	S	G3	S2	-
Reptile										
	X	-	*Clemmys guttata*	Spotted turtle	Maple Flats, Augusta Co	Mostly unpolluted, shallow bodies of water with a soft bottom and aquatic vegetation; small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, vernal pools, and lake margins.	S	G5	S4	S1
	X	-	*Glyptemys insculpta*	Wood turtle	Page, Rockingham, Shenandoah Cos; N Shenandoah R watershed	Along permanent streams during much of year; in summer may roam widely overland; variety of terrestrial habitats adjacent to streams, including deciduous woods, cultivated fields, and woodland bogs, marshy fields and pastures. Overwinters in streams.	S	G3	S2	S3
	X	X	*Pituophis melanoleucus*	Pinesnake	Historic records from Alleghany, Augusta, Botetourt, Craig, Rockingham Cos., VA: Monroe Co, WV. No current records known from GWJNF.	Xeric, pine-dominated or pine-oak woodland with open, low understory established on sandy soils; require forest openings, with level, well-drained sandy soils and little shrub cover as nesting/hibernation sites.	S	G4	S1?	SH
Bird										
	-	X	*Ammodramus henslowii*	Henslow's Sparrow	Pulaski Co (Radford Arsenal). No nest records known on GWJNF.	Open fields, meadows with grass interspersed with weeds or shrubby vegetation, especially in damp or low-lying areas; unmowed hayfields.	S	G4	S1B	S3B
Mammal										
	-	-	*Corynorhinus rafinesquii*	Rafinesque's big-eared bat	Has not been found in VA but has occurred nearby in WV, KY, & TN. In 1978, a large nursery colony was found in Hancock Co., TN, very close to the VA-TN border. Only possible in Lee, Scott, Washington Co.	Caves in winter, large hollow trees summer, may also use cliff-lines, buildings, and bridges in summer. Not on VADCR-NHP "Rare Animal" list.	S	G3G4	-	S1

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	X	X	*Corynorhinus townsendii virginianus*	Virginia big-eared bat	Summer: VA - Tazewell Co (3 caves), Highland Co (1 cave); WV - Pendleton Co (4 caves); Winter: Highland, Rockingham, Bland, and Tazewell Cos (6 caves); Pendleton Co (6 caves). Largest VA population in Tazewell Co and largest WV population in Pendleton Co. Small numbers of bats (usually <10) in a few other widely scattered caves during summer months. Bath & Pulaski Co records are historic. Known winter population in Church Mtn Cave, North River RD, Rockingham county.	Resides in caves winter and summer. Short distance migrant (<40 miles) between winter and summer caves. Forages primarily on moths and foraging habitat is common (fields, forests, meadows, etc.). Forages within 6 miles of summer caves. USFWS Critical Habitat is 5 caves in WV (4 Pendleton Co and 1 Tucker Co). Closest Critical Habitat cave to GWJNF is ~3 miles in Pendleton Co, WV. OAR code of "2" used when project further than 6 miles from summer or winter occupied cave.	E	G3G4T2	S1	S2
	-	X	*Glaucomys sabrinus coloratus*	Carolina northern flying squirrel	Mt Rogers & Whitetop area	Spruce-fir forests and adjacent northern hardwoods.	E	G5T2	S1	-
	X	-	*Glaucomys sabrinus fuscus*	Virginia northern flying squirrel	Laurel Fork area, Highland Co	Spruce forests and adjacent northern hardwoods.	S	G5T2	S1	S2
	-	X	*Myotis grisescens*	Gray bat	Ridge & Valley, Clinch R watershed; Russell Fk at Russell Fk/Pound R confluence.	Caves winter and summer, forages widely.	E	G3	S1	-
	X	X	*Myotis leibii*	Eastern small-footed bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in caves during winter, roosts in crevices of large rock outcrops, cliffs, and under large rocks in talus & boulder-fields during summer, plus similar man-made structures like rip-rap and bridges, forages widely in all forested and open habitat types over both ridges and valleys.	S	G1G3	S2	S1
	X	X	*Myotis septentrionalis*	Northern long-eared bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in crevices and cracks of cave walls during winter (sometimes mines & tunnels), difficult to find and rarely seen. During summer, forages widely and roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Also may roost in structures like barns, sheds, & houses. Decline due to WNS.	T	G1G2	S3	S3
	X	X	*Myotis sodalis*	Indiana bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Caves winter, upland hardwoods summer, forages widely along riparian areas and open woodlands.	E	G2	S1	S1
	X	X	*Perimyotis subflavus*	Tricolored bat	Every county in VA, WV, KY	Caves in winter: Caves, trees, cliffs, barns during summer months. Decline due to WNS. Formally: Eastern pipistrelle.	S	G3	S1S3	
INVERTEBRATE										
Snail (Mollusk, Class Gastropoda)										
	X	-	*Fontigens tartarea*	Organ cavesnail	Rock Camp Cave (1 mile from FS), McClung-Zenith Cave (1.5 mile from FS), Monroe Co, WV; Greenbrier, Pocahontas, Randolph, Tucker Cos, WV; Bath, Highland Cos, VA	Caves. Obligate troglobite.	S	G2	S1S2	S2
	-	-	*Gastrodonta fonticula*	Appalachia bellytooth	No known records on GWJ. Scott and Wise Co records need to be verified.	Damp, wooded environments, particularly in deep piles of wet leaf litter and around rotting wood debris.	S	G3G4	SU	SNR
	X	X	*Glyphyalinia raderi*	Maryland glyph	Alleghany, Montgomery Cos	Calciphile, edge of seeps within leaf litter. May burrow.	S	G2	S1S2	S2
	X	-	*Helicodiscus diadema*	Shaggy coil	Alleghany Co	Calciphile; semi-open, calcium-rich environments, especially limestone rubble/talus and thinly wooded limestone hills.	S	G1	S1	-
	X	X	*Helicodiscus triodus*	Talus coil	Alleghany, Botetourt, Rockbridge Cos	Calciphile, limestone rubble on wooded hillsides and near cave entrances.	S	G2	S1S2	SH
	-	X	*Io fluvialis*	Spiny riversnail	Clinch R, N Fk Holston R	Aquatic-rivers.	S	G2	S2	-
	-	-	*Paravitrea septadens*	Brown supercoil	Breaks Interstate Park, Dickenson Co; Buchanan Co., VA. No known records on GWJ.	Steep forested slopes and in ravines, often among woody debris, rocks, or deeper leaf litter; mixed eastern hemlock-hardwood forest, also in richer hardwood stands.	S	G1	S1	-
	-	-	*Stenotrema altispira*	Highland slitmouth	No known records on GWJ. Grayson and Smyth Co records need to be verified.	Higher elevations, in leaf litter and woody debris.	S	G3	S1	-
	-	-	*Ventridens decussatus*	Crossed dome	No known records on GWJ. Scott Co records need to be verified.	High elevations, usually >3000', in leaf litter, particularly oak leaves.	S	G3	SU	-
	-	-	*Vertigo bollesiana*	Delicate vertigo	No known records on GWJ. VA and WV records need to be verified.	Leaf litter often under shrubs, on cliff-face ledges and boulder tops in mesic upland forest, and damp microsites in northern white cedar wetlands.	S	G4	SU	-
	X	-	*Vertigo clappi*	Cupped vertigo	Greenbrier & Pendelton Cos, WV	Well-rotted, humid leaf litter and fine soil on shaded boulders, talus, ledges, and bases of forested lime-rich bedrock outcrops.	S	G1G2	SU	SNR
Mussel (Mollusk, Class Bivalvia)										
	-	X	*Alasmidonta marginata*	Elktoe	Greenbrier R & New R, WV. Upper New R; Reed Creek; Sinking Creek (Giles Co.); Wolf Creek (Bland Co.); upper S Fk Holston; historical Upper Clinch.	Aquatic-rivers.	S	G4	S1S2	S2
	X	-	*Alasmidonta varicosa*	Brook floater	Potomac drainage	Aquatic-rivers.	S	G3	S1	S1
	-	X	*Alasmidonta viridis*	Slippershell mussel	Historic in Upper Clinch R excluding Copper Creek where extant; Upper S Fk Holston	Aquatic-rivers.	S	G4G5	S1	-
	-	X	*Cumberlandia monodonta*	Spectaclecase	2 sites Clinch R	Aquatic-rivers.	E	G3	S1	-
	-	X	*Cyprogenia stegaria*	Fanshell	Lower Clinch R, Scott Co	Aquatic-rivers.	E	G1Q	S1	S1
	-	X	*Dromus dromas*	Dromedary pearlymussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
	X	X	*Elliptio lanceolata*	Yellow lance	Roanoke R, James R	Aquatic-rivers.	T	G2G3	S2S3	-
	-	X	*Epioblasma brevidens*	Cumberlandian combshell	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Epioblasma capsaeformis*	Oyster mussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Epioblasma florentina aureola*	Golden riffleshell	Restricted to lower 1.0 mile of Indian Ck to Clinch R. All other historical populations in M & Upper Tennessee R system now extirpated.	Aquatic-rivers. Formerly: tan riffleshell.	E	G1T1	S1	-
	-	X	*Epioblasma torulosa gubernaculum*	Green-blossom pearlymussel	Clinch R, N Fk Holston R	Aquatic-rivers.	E	G2TX	SX	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	-	X	*Epioblasma triquetra*	Snuffbox	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G3	S1	S2
	-	X	*Fusconaia cor*	Shiny pigtoe	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
	-	X	*Fusconaia cuneolus*	Fine-rayed pigtoe	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Fusconaia masoni*	Atlantic pigtoe	Roanoke R, Craig Ck drainage	Aquatic-rivers.	PT	G2	S2	-
	-	X	*Hemistena lata*	Cracking pearlymussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Lampsilis abrupta*	Pink mucket	Clinch R	Aquatic-rivers.	E	G2	SX	S1
	X	-	*Lampsilis cariosa*	Yellow lampmussel	N Fk Shenandoah R; Shenandoah, Warren Cos.	Aquatic-rivers.	S	G3G4	S2	S1
	-	X	*Lasmigona holstonia*	Tennessee heelsplitter	Upper Clinch, N and M Fk Holston R drainages; Wolf Ck, Bland Co below Burkes Garden	Aquatic-streams.	S	G3	S1	-
	X	-	*Lasmigona subviridis*	Green floater	Widely distributed in N & S Fk Shenandoah R, Pedlar R, James R	Aquatic-rivers.	S	G3	S2	S2
	-	X	*Lemiox rimosus*	Birdwing pearlymussel	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
	X	X	*Parvaspina collina*	James spinymussel	Potts Ck, Craig Ck, Johns Ck, Patterson Run, Pedlar R, Cowpasture R, Mill Ck (Deerfield)	Aquatic-rivers. Formerly: *Pleurobema collina*.	E	G1	S1	S1
	-	X	*Pegias fabula*	Little-winged pearlymussel	Clinch R, N Fk Holston R, S Fk Holston R, Little R	Aquatic-streams.	E	G1	S1	-
	-	X	*Plethobasus cyphyus*	Sheepnose	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S1
	-	X	*Pleurobema cordatum*	Ohio pigtoe	Clinch R	Aquatic-rivers.	S	G4	S1	S2
	-	X	*Pleurobema oviforme*	Tennessee clubshell	Clinch R, Powell R, N, Middle, S Fk Holston R	Aquatic-streams.	S	G2G3	S2S3	-
	-	X	*Pleurobema plenum*	Rough pigtoe	Clinch R	Aquatic-rivers.	E	G1	SH	SH
	-	X	*Pleurobema rubrum*	Pyramid pigtoe	Upper Clinch R	Aquatic-rivers.	S	G2G3	SH	-
	-	X	*Pleuronaia barnesiana*	Tennessee pigtoe	Clinch R, Powell R, N Middle, S Fk Holston R	Aquatic-rivers.	S	G2G3	S2	-
	-	X	*Pleuronaia dolabelloides*	Slabside pearlymussel	Clinch R, M Fk Holston, N Fk Holston R	Aquatic-rivers.	E	G2	S2	-
	-	X	*Ptychobranchus subtentum*	Fluted kidneyshell	Holston R., Powell R., Indian R., Clinch R., Little R., Copper Ck., Big Moccasin Ck. Critical Habitat: Indian Ck, VA: M Fk Holston R. VA: Big Moccasin Ck., VA: Copper Ck., VA; Clinch R, TN, VA: Powell R., TN, VA	Aquatic-rivers.	E	G2	S2	-
	-	X	*Quadrula cylindrica strigillata*	Rough rabbits foot	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-streams.	E	G3G4T2	S2	-
	-	X	*Quadrula intermedia*	Cumberland monkeyface	Powell R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Quadrula sparsa*	Appalachian monkeyface	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
	-	X	*Toxolasma lividum*	Purple lilliput	N Fk Holston R, Clinch R	Aquatic-rivers.	S	G3Q	SH	-
	-	X	*Villosa perpurpurea*	Purple bean	Clinch R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
	-	X	*Villosa trabalis*	Cumberland bean	Clinch R	Aquatic-rivers.	E	G1	SX	-
Spider (Arachnid)										
	-	X	*Microhexura montivaga*	Spruce-fir moss spider	Whitetop Mtn	Damp, well-drained moss and liverwort mats on boulders in mature spruce-fir forests.	E	G1	S1	-
Amphipod (Crustacean, Order Amphipoda)										
	-	X	*Stygobromus abditus*	James Cave amphipod	James, Sam Bells caves, Pulaski Co; Watsons cave, Wythe Co; and other New River caves.	Aquatic-caves, water well.	S	G3	S3	-
	-	X	*Stygobromus emarginatus*	Greenbrier Cave amphipod	Greenbrier, Monroe Cos, WV	Aquatic-caves. In caves under gravel in streambeds, occasionally in pools. Most abundant in smallest trickles of water. Primarily in tiny first and second order headwater cave streams.	S	G3	-	S3
	X	-	*Stygobromus gracilipes*	Shenandoah Valley cave amphipod	Frederick, Rockingham, Shenandoah, Warren Cos	Aquatic-caves.	S	G3G4	S3	S1
	X	-	*Stygobromus hoffmani*	Alleghany County cave amphipod	Low Moor cave, Alleghany Co	Aquatic-caves, groundwater habitats including springs and seeps.	S	G2	S2	-
	X	-	*Stygobromus mundus*	Bath County cave amphipod	Alleghany, Bath Cos	Aquatic-caves.	S	G2G3	S1S2	-
	-	X	*Stygobromus pollostus*	Least Cave stygobromid	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G2G3	-	S3
	-	X	*Stygobromus spinatus*	Spiny Cave stygobromid	Southern Monroe Co, north-northeast to central Pocahontas, Co, WV, primarily within the Greenbrier Valley. Covers a linear distance of ~67 miles.	Aquatic-caves. In gravels of small streams and in small cave pools.	S	G2G3	-	S2
Isopod (Crustacean, Order Isopoda)										
	X	-	*Antrolana lira*	Madison Cave Isopod	Documented population centers in Waynesboro-Grottoes area, Augusta Co; Harrisonburg area Rockingham Co; valley of main stem of Shenandoah R, Warren, Cos,VA: Jefferson Co, WV. Not known from GWNF.	Aquatic-subterranean obligate in caves and karst groundwater.	T	G2G4	S2	S1
	-	X	*Caecidotea incurva*	Incurved cave isopod	McCullin Cave, Smyth Co; Groseclose Cave No. 1, Wythe Co	Aquatic-caves.	S	G2G4	S2	-
	X	X	*Miktoniscus racovitzai*	Racovitza's terrestrial cave isopod	Alleghany, Botetourt, Page, Rockbridge, Shenandoah Cos	Aquatic-caves.	S	G3G4	S2	-
Crayfish (Crustacean, Order Decapoda)										
	-	X	*Cambarus callainus*	Big Sandy crayfish	In VA, Upper Russell Fk drainage Big Sandy R	Aquatic-streams. Fast flowing streams of moderate width. Formerly: *Cambarus veteranus*.	T	G2	S1S2	S1
Centipede (Insect, Order Chilopoda)										
	X	X	*Escaryus cryptorobius*	Montane centipede	The Priest, Nelson Co; Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Upper soil horizon, spruce-birch forests.	S	G2	S2	-
	-	X	*Escaryus orestes*	Whitetop Mountain centipede	Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Dark moist soil and litter, spruce-birch forests.	S	G1G2	S1S2	-
Springtail (Insect, Order Collembola)										
	X	-	*Pygmarrhopalites sacer*	A cave springtail	Bath Co	Caves.	S	G2	S2	-
Dragonfly (Insect, Order Odonata)										
	X	X	*Gomphus viridifrons*	Green-faced clubtail	New R, Craig Ck, Pound R, Locust Spring	Aquatic-rivers.	S	G3G4	S2	S2
	-	X	*Ophiogomphus howei*	Pygmy snaketail	Upper New R; Carroll, Grayson, Wythe Cos	Aquatic-rivers.	S	G3	S1S2	-
Stonefly (Insect, Order Plecoptera)										

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	-	X	*Allocapnia fumosa*	Smokies snowfly	High elevation rheocrenes (flowing springs) of Mt. Rogers. Grayson, Smyth Cos.	Aquatic-streams.	S	G2	S1S2	
	-	X	*Megaleuctra williamsae*	Smokies needlefly	Mt Rogers & Whitetop Mtn	Aquatic-streams.	S	G2	S1S2	-
	-	X	*Taeniopteryx nelsoni*	Cryptic willowfly	Lewis Fk & Grindstone Branch N of Mt Rogers	Aquatic-streams.	S	G1	S1	-
Beetle (Insect, Order Coleoptera)										
	X	X	*Cicindela patruela*	Northern barrens tiger beetle	Blue Ridge, Ridge & Valley	Eroded slopes of exposed sandstone and conglomerate.	S	G3	S2	S2S3
	-	-	*Pseudanophthalmus avernus*	Avernus Cave beetle	Endemic to Endless Caverns (commercial cave, non-FS) Rockingham Co.	Caves.	S	G1	S1	-
	-	X	*Pseudanophthalmus cordicollis*	Little Kennedy Cave beetle	Franklins Pit, Little Kennedy Cave, Omega Cave System, Wildcat Saltpetre Cave, Wise Co., VA	Caves.	S	G1	S1	-
	X	-	*Pseudanophthalmus intersectus*	Crossroads Cave beetle	Known only from Crossroads Cave, Millboro Springs, Bath Co.	Caves.	S	G1G2	S1	-
Scorpionfly (Insect, Order Mecoptera)										
	-	X	*Brachypanorpa jeffersoni*	Jefferson's short-nosed scorpionfly	Sugar Run Mountain, Giles Co; Whitetop Mtn, Smyth Co.	Moist soil around seeps. Only known from high elevation. Larvae use short burrows in loose soil and moss.	S	G2	S1S2	-
Butterfly, Skipper, Moth (Insect, Order Lepidoptera)										
	-	X	*Atrytone arogos*	Arogos skipper	Historic records, Blacksburg area. Caldwell Fields records need to be verified.	Relatively undisturbed grasslands, prairies, sand prairies, serpentine barrens, grassland/herbaceous, old field. Larval host plant; big bluestem *Andropogon gerardi.*	S	G3	SH	-
	X	X	*Calephelis borealis*	Northern metalmark	Alleghany, Augusta, Bath, Botetourt, Craig, Lee, Montgomery, Russell, Scott Cos: Historic records from Giles, Rockbridge Cos.	Openings within forested or wooded areas, natural outcrops, shale or limestone barrens, glades or powerline right of ways. Larvae host plant; round-leaf ragwort, *Senecio obovatus.*	S	G3G4	S2S3	S2
	X	X	*Callophrys irus*	Frosted elfin	Frederick, Montgomery, Page, Roanoke Cos.	Dry, open woods, clearings, and road/powerline ROWs with abundant wild indigo, *Baptisia tinctoria*.	S	G3	S2?	S1
	X	X	*Danaus plexippus*	Monarch	Blue Ridge, Ridge & Valley	Mixed hardwood/conifer forest; shrubland; grassland/herbaceous; old field; suburban/orchard; cropland/hedgerow. Larval host plant; milkweeds *Asclepias* spp.	S	G4	S4	S4
	X	X	*Speyeria idalia*	Regal fritillary	Blue Ridge, Ridge & Valley	Riparian, grasslands-shrublands. Larval host plant, violets, *Viola* spp.	S	G3	S1	S1
	X	X	*Erora laeta*	Early hairstreak	Bedford, Botetourt, Page, Rockbridge, Warren, Wise Cos., VA; Monroe, Pendleton Cos., WV. Historic records from Giles, Montgomery Cos.	Hardwood forests or hardwood-northern conifer mixed forests. Larval host food, young fruit of American beech, *Fagus grandifolia*, nuts of beaked hazelnut *Corylus cornuta.* Canopy dweller.	S	GU	S2	S2
	X	X	*Erynnis martialis*	Mottled duskywing	Historic records from Augusta, Bedford, Botetourt, Craig, Montgomery, Rockbridge Cos.; St. Mary's R near entrance to Wilderness Area, Augusta Co.	Open woodland; barrens; open brushy fields. Larval host plant; New Jersey tea *Ceanothus americanus*.	S	G3	S1S3	S3
	X	X	*Erynnis persius persius*	Persius duskywing	Blue Ridge, Ridge & Valley	Bogs, wet meadows, open seepages in boreal forests. Larval host plant; lupine, *Lupinus perennis*, wild indigo, *Baptisia tinctoria*.	S	G5T1T3	S1	-
	X	-	*Pyrgus centaureae wyandot*	Appalachian grizzled skipper	Ridge & Valley	Shale barrens, open shaley oak woodlands. Larval host plant; cinquefoil, *Potentilla* spp, strawberry, *Fragaria virginina.*	S	G5T1T2	S1	S1
	X	X	*Catocala herodias gerhardi*	Herodias underwing	Bald Knob, Bath Co; Poverty Hollow, Montgomery Co; Sand Mtn, Wythe Co (non FS property)	Pitch pine/bear oak scrub woodlands, >3000'. Larval host plant; oak, *Quercus* spp.	S	G3T3	S2S3	SU
	-	X	*Catocala marmorata*	Marbled underwing	Montgomery Co	Mesic montane hardwood forests; Forested wetland, riparian. Larval host plants; willows/cottonwoods, *Salix/Populus*.	S	G3G4	S2	-
	X	-	*Euchlaena milnei*	Milne's euchlaena moth	Warm Springs Mtn, Catawba Creek Slopes, Sweet Spring Hollow, Salt Pond Mtn. (Doe Creek)	Moist, forested slopes of mixed pine hardwoods. Acidic oak woods.	S	G2G4	S2	S2
Bee (Insect, Order Hymenoptera)										
	X	X	*Bombus affinis*	Rusty-patched bumble bee	Bath and Highland Co, VA: new location on Warm Springs RD, Duncan Knob found 6/2017. Following VA/WV county occurrences historic (Alleghany, Carroll, Frederick, Giles, Grayson, Montgomery, Nelson, Page, Pulaski, Rockbridge, Rockingham, Wythe Cos., VA; Hardy, Hampshire, Monroe, Pendleton, Pocahontas Cos, WV).	Habitat generalist: grasslands, old field, mature woods, open woodlands, mixed farmland edges, marshes, urban areas. Feeds from a variety of plants for pollen and nectar, including flowering rhododendron and mountain laurel. Nest sites include abandoned rodent burrows, fallen dead wood, stumps. Queen only overwinters.	E	G1	SH	-
NON-VASCULAR PLANT										
Lichen										
	-	X	*Alectoria fallacina*	Witch's-hair lichen	Smyth, Grayson Co	S. Appalachian endemic. Conifer trees, especially fir rarely on birch, in spruce-fir forests; rarely fire cherry communities.	S	G2	SH	SNR
	-	X	*Gymnoderma lineare*	Rock gnome lichen	Whitetop Mtn	Spruce-fir forests.	E	G2	S1	-
	X	X	*Heterodermia appalachensis*	Appalachian shield lichen	St. Mary's Wilderness, Augusta Co.; Skidmore Fork, Rockingham Co.; Browns Run, Page Co.; rock outcrop, 6 mi. SE of Edinburg, Page Co.; summit of Whitetop Mt, Washington Co.	Bark of hardwoods, occasionally on shaded rocks.	S	G2?	S1	-
	-	X	*Heterodermia erecta*	A foliose lichen	Along Whitetop access road, 1.2 mile from summit, Grayson Co., VA.	S. Appalachian endemic.	S	G1?	S1	-
	-	X	*Hypotrachyna oostingii*	A foliose lichen	Mount Rogers, on Smyth, Grayson Co. line	Spruce-fir forests.	S	G2?	SU	-
	-	X	*Hypotrachyna virginica*	Virginia hypotrachyna lichen	Mt Rogers & Whitetop Mtn	Spruce-fir forests. Found on spruce, fir, rhododendron in spruce-fir and fire-cherry communities in S. Appalachian Mtns. Typically at higher elevations, has been found at lower elevations.	S	G1G2	S1	SNR
	-	X	*Lecanora masana*	A lichen	Whitetop Mtn, and Grayson, Smyth Cos	S. Appalachian endemic. Spruce-fir, northern hardwood-conifer forest.	S			

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	X	-	*Melanelia culbersonii*	Culberson's Black-parmelia	Massanutten (Fridley watershed) Rockingham Co; along trail from Wolf Gap Campground to Big Schloss, Shenandoah Co.	Rocks in open areas and on talus slopes. Fully exposed, minimally weathered quartzite and sandstone boulderfields at elevations from about 1000-3300 ft.	S	G2	S4	-
Liverwort										
	-	X	*Bazzania nudicaulis*	A liverwort	Mt Rogers & Whitetop Mtn	Bark and rock outcrops in spruce-fir forests.	S	G2G3	S?	-
	X	-	*Cephaloziella spinicaulis*	A liverwort	Along SR 33, 10 miles W of Harrisonburg.	Damp soil in crevices of shaded sedimentary rocks, in hemlock-hardwoods forest and humid to dry faces of ledges and cliffs in open oak-hickory forest.	S	G3G4	SNR	-
	-	X	*Leptoscyphus cuneifolius*	Wedge Flapwort	Grayson Co	Bark of Fraser fir.	S	G4G5	SH	-
	-	X	*Nardia lescurii*	A liverwort	Blue Ridge, Ridge & Valley	Riparian - on peaty soil over rocks, usually in shade and associated with water, <3000'.	S	G3?	S1	-
	-	X	*Plagiochila austinii*	A liverwort	Little Stony Ck – Cascades; Red Ck on Beartown Mtn	Rich, moist, densely forested ravines; shaded outcrops.	S	G3	S?	-
	-	X	*Plagiochila corniculata*	A liverwort	Grayson, Smyth Cos	Limited to densely shaded, humid, often fog-enshrouded mountain summits, usually to the spruce-fir association. Most commonly found on Fraser fir.	S	G4?	SNR	-
	-	X	*Plagiochila sullivantii var. sullivantii*	A liverwort	Whitetop Mtn, Salt Pond Mtn	Moist shaded rock outcrops, under cliff ledges, in crevices.	S	G2T2	SNR	-
	X	X	*Plagiochila virginica*	A liverwort	Bath, Giles, Highland, Roanoke Cos	S. Appalachian endemic. Damp to intermittently dry calcareous or sandstone ledges or cliffs in partially exposed sites.	S	G3	SNR	SNR
	X	X	*Radula tenax*	A liverwort	Alleghany, Amherst, Dickenson, Giles, Highland, Nelson, Smyth, Washington Cos	Moist rocks or trees in mountains below spruce-fir zone; Depressed, dense mats on moist rocks, less frequently on tree trunks, in mountainous and hilly regions. Two discrete modes of occurrence: on shaded, damp rocks, and on tree bark in deep, moist forests. Does not tolerate submersion.	S	G3G4	SU	SNR
	-	X	*Sphenolobopsis pearsonii*	A liverwort	Mt Rogers & Whitetop Mtn	Bark of Fraser fir, mountain ash, occasionally on red spruce, >5000'.	S	G2	S?	-
Moss										
	-	X	*Sphagnum flavicomans*	Northeastern peatmoss	Whitetop Mtn	Bogs, seeps.	S	G3	SU	-
VASCULAR PLANT										
	-	X	*Abies fraseri*	Fraser fir	Grayson, Smyth Cos	S. Appalachian endemic. Spruce–fir forests, bogs >5000‘	S	G2	S1	SNR
	X	X	*Aconitum reclinatum*	Trailing white monkshood	Blue Ridge, Ridge & Valley	Rich cove sites, streambanks, seepages; all with high pH.	S	G3	S3	S3
	-	X	*Actaea rubifolia*	Appalachian black cohosh	Lower Clinch R watershed, Scott, Wise Cos	Moist, rich wooded bluffs over limestone.	S	G3	S1	-
	X	X	*Allium oxyphilum*	Nodding onion	Monroe, Summers, Mercer, Greenbrier Cos, WV	Shale barrens, sandstone glades.	S	G2	S1	S2
	X	-	*Arabis patens*	Spreading rockcress	Frederick, Lee, Page, Shenandoah, Warren Cos, VA; Hampshire, Hardy, Pendleton Cos, WV	Shaded, calcareous cliffs, bluffs, and talus slopes.	S	G3	S1	S2
	X	X	*Berberis canadensis*	American barberry	Blue Ridge, Ridge & Valley	Calcareous open woods, bluffs, cliffs, and along fencerows.	S	G3	S3S4	S1
	-	X	*Betula uber*	Virginia round-leaf birch	One location: Cressy Ck, Smyth Co.	Riparian, mixed open forest, usually disturbed sites.	T	G1Q	S1	-
	X	-	*Boechera serotina*	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods.	E	G2	S2	S2
	X	-	*Boltonia montana*	Mountain doll's-daisy	Augusta Co	Sinkhole ponds.	S	G1G2	S1	-
	-	X	*Botrychium jenmanii*	Alabama Grapefern	Russell & Wise Cos.	Open woods, old fields, pastures. Formerly: *Sceptridium jenmanii*	S	G3G4	SH	-
	X	X	*Buckleya distichophylla*	Piratebush	Blue Ridge S of Roanoke R, Ridge & Valley S of James R	Open oak and hemlock woods.	S	G3	S2	-
	-	X	*Cardamine clematitis*	Mountain bittercress	Blue Ridge, Ridge & Valley, S of New R watershed	Riparian, spring seeps, rocky streamsides.	S	G3	S1	-
	X	X	*Carex polymorpha*	Variable sedge	Blue Ridge, Ridge & Valley, N of James R	Open acid soil, oak-heath woodlands, responds positively to fire.	S	G3	S2	S1
	X	X	*Carex schweinitzii*	Schweinitz's sedge	Augusta, Bath, Highland, Montgomery, Pulaski, Washington Cos	Bogs, limestone fens, marl marshes.	S	G3G4	S1	-
	-	X	*Chelone cuthbertii*	Cuthbert turtlehead	Blue Ridge Plateau, Grayson, Carroll Cos	Bogs, wet meadows, boggy woods and thickets.	S	G3	S2	-
	-	X	*Cleistesiopsis bifaria*	Small spreading pogonia	Craig, Dickenson, Scott, Wise Cos	Well drained, rather open, scrubby hillsides, oak-pine-heath woodlands, acidic soils.	S	G4?	S2	S1
	-	X	*Clematis addisonii*	Addison's leatherflower	Montgomery, Roanoke, Botetourt, Rockbridge Cos	Open glades & rich woods over limestone and dolostone.	S	G1?	S2	-
	X	X	*Clematis coactilis*	Virginia white-haired leatherflower	Ridge & Valley, Rockbridge Co, S to Wythe Co	Shale barrens, rocky calcareous woodlands.	S	G3	S3	-
	X	-	*Clematis viticaulis*	Millboro leatherflower	Endemic to VA, only in Bath, Rockbridge Cos.	Shale barrens, open shaly woodlands.	S	G1	S1	-
	X	X	*Corallorhiza bentleyi*	Bentley's coralroot	Alleghany, Bath, Giles Cos VA; Monroe, Pocahontas Cos WV	Dry, acid woods, along roadsides, well-shaded trails.	S	G2	S2	S1
	X	X	*Delphinium exaltatum*	Tall larkspur	Blue Ridge, Ridge & Valley	Dry calcareous soil in open grassy glades or thin woodlands.	S	G3	S3	S2
	X	-	*Echinodorus tenellus*	Dwarf burhead	Pines Chapel Pond, Augusta Co	Pond margins, wet depressions in sandy soil.	S	G5?	S1	-
	X	X	*Echinacea laevigata*	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite.	E	G2G3	S2	-
	X	X	*Euphorbia purpurea*	Glade spurge	Blue Ridge, Ridge & Valley	Rich, swampy woods, seeps and thickets.	S	G3	S2	S2
	X	X	*Gaylussacia brachycera*	Box huckleberry	Alleghany, Bath, Bland, Carroll, Craig, Dickenson, Montgomery Cos	Dry, acidic forests, woodlands of oaks, pines, and other heaths.	S	G3	S1	S2
	X	X	*Gymnocarpium appalachianum*	Appalachian oak fern	Alleghany, Augusta, Bath, Highland, Page, Rockbridge, Rockingham, Warren Cos	Maple-birch-hemlock woods on mountain slopes and summits, moist sandstone, talus slopes, or bouldery colluvium. Requires cool, moist microclimate, typically on north-facing slopes with cold air seepage >2000’.	S	G3	S3	S1
	X	-	*Helenium virginicum*	Virginia sneezeweed	Endemic to Augusta, Rockingham Cos.	Seasonally dry meadows and sinkhole depressions.	T	G3	S2	-
	X	-	*Helonias bullata*	Swamp-pink	Augusta, Nelson Cos	Sphagnum bogs, seeps, and streamsides.	T	G3	S2S3	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
	X	-	*Heuchera alba*	White alumroot	Shenandoah Mtn	High elevation rocky woods and bluffs.	S	G2Q	S1	S2
	X	X	*Ilex collina*	Long-stalked holly	Blue Ridge, Ridge & Valley	Bogs, seep, shrubby streamheads, >3100'.	S	G3	S1	S2
	-	X	*Iliamna corei*	Peter's Mountain-mallow	One location: Narrows, Peters Mountain, Giles Co.	Rich, open woods along sandstone outcrops, soil pockets, fire maintained.	E	G1	S1	-
	X	X	*Isotria medeoloides*	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain.	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	G2?	S2	S1
	X	X	*Juglans cinerea*	Butternut	Blue Ridge, Ridge & Valley	Well-drained bottomland and floodplain, rich mesophytic forests, mostly along toeslopes.	S	G4	S3?	S3
	X	X	*Liatris helleri*	Turgid gayfeather	Blue Ridge, Ridge & Valley	Shale barrens, mountain hillside openings. *L.turgida* synonymous with *L. helleri.*	S	GNR	S3	S2
	-	X	*Lilium grayi*	Gray's lily	Blue Ridge, Mt Rogers & Whitetop Mtn (occurrences north of Floyd Co questionable).	Bogs, open seeps, wet meadows, grassy balds.	S	G3	S2	-
	X	X	*Monotropsis odorata*	Sweet pinesap	Blue Ridge, Ridge & Valley	Dry oak-pine-heath woodlands, soil usually sandy.	S	G3	S3	S1
	-	X	*Packera millefolium*	Piedmont ragwort	Lee, Scott Cos	Open limestone outcrops and cedar barrens.	S	G2	S2	-
	X	X	*Parnassia grandifolia*	Largeleaf grass-of-Parnassus	Augusta, Bland, Giles, Grayson, Lee, Montgomery, Russell, Washington, Wythe	Fens, thinly wooded, gravelly seeps over limestone, dolomite, amphibolite, and ultramafic rocks; restricted to calcareous or magnesium-rich soils.	S	G3	S1	-
	X	-	*Paxistima canbyi*	Canby's mountain lover	Ridge & Valley, Sarver Barrens SBA, Craig Co	Calcareous cliffs and bluffs, usually undercut by stream.	S	G2	S2	S2
	X	X	*Phemeranthus teretifolius*	Quill fameflower	Amherst, Augusta (west side of Blue Ridge, near Laurel Springs Gap, Humpback Mtn SBA), Bedford, Carrol, Craig (Bald Mtn SBA), Grayson, Montgomery, Nelson, Page, Roanoke, Rockingham, Warren Cos, VA; Hardy & Hampshire Cos, WV	Calcareous sandstone glades, metabasalt barrens. Also *Talinum teretifolium* (Roundleaf fameflower)	S	G4	S4	S1
	X	X	*Phlox buckleyi*	Sword-leaf phlox	Blue Ridge, Ridge & Valley	Open, often dry oak woodlands and rocky slopes, usually over shale in humus rich soils, often along roadsides.	S	G2	S2	S2
	X	X	*Poa paludigena*	Bog bluegrass	Blue Ridge, Ridge & Valley	Shrub swamps and seeps, usually under shade.	S	G3	S2	S1
	X	-	*Potamogeton hillii*	Hill's pondweed	Bath Co	Clear, cold calcareous ponds.	S	G3	S1	-
	X	-	*Potamogeton tennesseensis*	Tennessee pondweed	Ridge & Valley	Ponds, back water of streams and rivers.	S	G2G3	S1	S2
	X	X	*Pycnanthemum torrei*	Torrey's mountain-mint	Bland, Bath, Giles, Rockbridge, Wythe Cos	Open, dry rocky woods, roadsides, and thickets near streams, heavy clay soil over calcareous rock.	S	G2	S2	S1
	X	X	*Scirpus ancistrochaetus*	Northeastern bulrush	Ridge & Valley	Mountain ponds, sinkhole ponds in Shenandoah Valley.	E	G3	S2	S1
	X	X	*Scutellaria saxatilis*	Rock skullcap	Blue Ridge, Ridge & Valley	Rich, dry to mesic ridgetop woods, 32 counties in VA, likely G4/S4.	S	G3	S3	S2
	-	X	*Silene ovata*	Mountain catchfly	Dickenson, Lee, Wise Cos	Rich woodlands and forests over limestone.	S	G3	S1	-
	-	X	*Spiraea virginiana*	Virginia spiraea	Blue Ridge, Ridge & Valley, S of New R	Scoured banks of streams, riverside or island shrub thickets.	T	G2	S1	S1
	X	X	*Thermopsis mollis*	Soft-haired thermopsis	Amherst, Bath, Bedford, Botetourt, Montgomery, Rockbridge Cos	Dry, open forests, woodlands, and clearings.	S	G3G4	S3	-
	X	X	*Trifolium virginicum*	Kate's Mountain clover	Alleghany, Augusta, Bath, Botetourt, Craig, Frederick, Highland, Rockbridge, Rockingham, Shenandoah, Warren Cos	Shale barrens.	S	G3	S3	S3
	-	X	*Tsuga caroliniana*	Carolina hemlock	Blue Ridge north to James R.	Rocky ridges and slopes, usually dry and well drained.	S	G3	S3	-
	X	X	*Vitis rupestris*	Sand grape	Ridge & Valley	Scoured banks of rivers and streams over calcareous bedrock.	S	G3	S1	S2

LEGEND FOR TES SPECIES LIST IN OCCURRENCE ANALYSIS RESULTS:

OAR CODES:

1 = Project located out of known species range.
2 = Lack of suitable habitat for species in project area.
3 = Habitat present, species was searched for during field survey, but not found.
4 = Species occurs in project area, but outside of activity area.
5 = Field survey located species in activity area.
6 = Species not seen during field survey, but possibly occurs in activity area based on habitat observed; or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.
7 = Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).
8 = Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
9 = Project occurs in a 6th level watershed included in the USFWS/FS T&E Mussel and Fish Conservation Plan (August 8, 2007 U.S. Fish & Wildlife Service concurrence on updated watersheds). Conservation measures from the USFWS/FS T&E Mussel and Fish Conservation Plan applied.
10 = Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia.

SPECIES: The term "species" includes any subspecies of fish, wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature (Endangered Species Act of 1973, as amended through the 100th Congress).

RANGE: The geographical distribution of a species. For use here "range" is expressed as where a species is known or expected to occur on or near the George Washington and Jefferson National Forests in terms of landform (feature name, physiographic province), political boundary (county name), or watershed (river, or stream name).

HABITAT: A place where the physical and biological elements of ecosystems provide a suitable environment and the food, cover and space resources needed for plant and animal livelihood (FSM 2605-91-8, pg. 10 of 13).

TES CODES:

T = Federally listed as Threatened
E = Federally listed as Endangered
P = Federally Proposed as T or E
S = Southern Region (R8) Sensitive species

GLOBAL RANK: Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, NatureServe and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species or variety. This system was developed by The Nature Conservancy and is widely used by other agencies and organizations as the best available scientific and objective assessment of taxon rarity and level of threat to its existence. The ranks are assigned after considering a suite of factors including number of occurrences, numbers of individuals, and severity of threats.

G1 = Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 = Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.
G4 = Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.
G5 = Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.
GH = Formally part of the world's biota with the exception that may be rediscovered.
GX = Believed extinct throughout its range with virtually no likelihood of rediscovery.
GU = Possibly rare, but status uncertain and more data needed.
G? = Unranked, or, if following a ranking, ranking uncertain (ex. G3?).
G_Q = Taxon has a questionable taxonomic assignment, such as G3Q.
G_T = Signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

STATE RANK: The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources (NHRs) are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
- **S2** - Very rare; usually between 6 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.
- **S3** - Rare to uncommon; usually between 21 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- **S4** - Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
- **S5** - Very common; demonstrably secure under present conditions.

- **SA** - Accidental in the state.
- **S#B** - Breeding status of an organism within the state.
- **SH** - Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#N** - Non-breeding status within the state. Usually applied to winter resident species.
- **SR** – Reported for Virginia, but without persuasive documentation that would provide a basis for either accepting or rejecting the report.
- **SU** - Status uncertain, often because of low search effort or cryptic nature of the element.
- **SX** - Apparently extirpated from the state.
- **SZ** - Long distance migrant, whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.
- **NA** – Not Applicable- A conservation status rank in not applicable because the species is not a suitable target for conservation activities.

These ranks should not be interpreted as legal designations.

George Washington and Jefferson National Forests - Locally Rare Species List
Global and State Ranks based on 2018 NatureServe rankings. (List Revised: February 2019)

VA-DCR/DNH - Virginia Department of Conservation and Recreation, Division of Natural Heritage.

WV-DNR/WDU - WV Division of Natural Resources, Wildlife Diversity Unit.

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
VERTEBRATES										
Fish										
X	_	*Cottus girardi*	Potomac sculpin	Ridge and Valley. James R drainage, Cowpasture R. Widespread. Occupies all major hydrographic subdivisions of Potomac drainage, except on lower Piedmont and Coastal Plain. Avoids the Blue Ridge, to which it has ready access.	Aquatic-streams.	___	G4	S3S4	S4S5	
_	X	*Chrosomus tennesseensis*	Tennessee dace	Lick Ck, N Fk Holston R, Beaverdam Ck, M Fk Holston R.	Aquatic-streams.	E	G3	S1	___	Synonym: *Phoxinus tennesseensis.*
_	X	*Cyprinella whipplei*	Steelcolor shiner	In VA, known from only five sites in the Clinch R.	Aquatic-streams, rivers.	T	G5	S1	S4	Synonym: *Notropis whipplei.*
_	X	*Etheostoma chlorobranchium*	Greenfin darter	In VA, known only from L Whitetop Laurel Ck; Tributary to Laurel Ck of S Fk of Holston R system.	Aquatic-streams.	T	G4	S1	___	
_	X	*Notropis spectrunculus*	Mirror shiner	U, S, M Fk Holston; Clinch; Powell R; Smyth Co.	Aquatic-streams, rivers.	___	G4	S2	___	
_	X	*Phenacobius crassilabrum*	Fatlips minnow	Unimpounded lower S Fk Holston R, Whitetop Laurel Ck.	Aquatic-rivers.	___	G3G4	S2	___	
_	X	*Uranidea baileyi*	Black sculpin	Little R, U Clinch R, S Fk Holston R.	Aquatic-streams.	___	G4Q	S2	___	Synonym: *Cottus baileyi.*
Amphibian										
X	_	*Ambystoma tigrinum*	Tiger salamander	Augusta Co.	Seasonally dry sinkhole ponds.	E	G5	S1	___	
_	X	*Desmognathus marmoratus*	Shovel-nosed salamander	Five sites near Whitetop Mtn in Grayson, Washington Cos.	Aquatic-streams.	___	G4	S2	___	
_	_	*Plethodon shenandoah*	Shenandoah salamander	Three isolated populations in SNP, Hawksbill Mtn, The Pinnacles, Stony Man Mtn. Erroneous records from Three Ridges, The Priest, Pompeii on the Pedlar RD.	Talus slopes.	E	G1	S1	___	
Reptile										
X	_	*Opheodrys vernalis*	Smooth greensnake	Alleghany, Augusta, Bath, Craig, Highland, Page, Rockingham, Roanoke Cos.	Mesic habitats; wet meadows; bog and marsh edges; open woodlands.	___	G5	S3	S5	Synonym: *Liochlorophis vernalis.*
X	_	*Plestiodon anthracinus*	Coal skink	Alleghany, Augusta, Bath, Botetourt, Montgomery, Rockbridge, Rockingham Cos.	Humid, wooded or rocky hillsides (mixed pine-hardwoods). Under logs, rocks, leaf litter on forest floor.	___	G5	S3	S2	Synonym: *Eumeces anthracinus.*
X	_	*Virginia valeriae pulchra*	Mountain earthsnake	Northwestern Highland Co.	Deciduous hardwoods, mixed hardwood-pine, second growth; short grassy slopes over sandstone. Found in rich deciduous woodlands, fields, pastures and gardens where the soil is loose enough to burrow	___	G5T3T4	S1S2	S2	
Bird										
X	X	*Accipiter cooperii*	Cooper's Hawk	Potts Mtn, Craig Co.; Mt. Rogers, Grayson, Smyth Cos.; Highland, Lee, Scott, Wise Cos.	Woodlands, forest edges, river groves, deciduous woods, broken woodlands, along streams.	___	G5	S3B/S3N	S3B/S4N	
X	X	*Accipiter striatus*	Sharp-shinned Hawk	Alleghany, Giles, Grayson, Scott, Smyth, Tazewell, Washington Cos.	Coniferous forests; woodland edges; mixed woodlands, especially coniferous-birch-aspen forests.	___	G5	S3S4	S3B/S4N	
X	X	*Aegolius acadicus*	Northern Saw-whet Owl	Rare transient and winter visitor. Rare and very local summer resident at high elevations with summer records from Bath, Grayson, Highland, Smyth and Tazewell Cos. Breeding: Laurel Fk, Highland Co; Shenandoah Co; Mt Rogers, Grayson Co.	Mixed coniferous-deciduous woods.	___	G5	S1B/S2N	S2B/S2N	
X	X	*Aquila chrysaetos*	Golden Eagle	Transient and winter visitor; winter resident in southwestern VA and Highland Co. Rare Summer visitor. No firm breeding records.	Mostly forested ridgetops with scattered openings.	___	G5	SHB/S1N	S3N	
X	X	*Catharus guttatus*	Hermit Thrush	Common transient and uncommon winter resident. Highland, Page, Russell Co; Shenandoah Mtn, Rockingham; Beartown Mtn, Tazewell; Whitetop Mtn, Mt Rogers, Grayson, Smyth, Washington Cos.	Northern and montane coniferous forests.	___	G5	S1B/S5N	S3B/S4N	
X	X	*Catharus ustulatus*	Swainson's Thrush	Rare summer resident on Mt. Rogers since 1966, Grayson Co; Beartown, Tazewell Co; Highland Co.	Dense shaded woods, mixed coniferous woods.	___	G5	S1B	S3B	
X	X	*Certhia americana*	Brown Creeper	Highland Co; Mt Rogers, Grayson, Smyth, Washington Cos.	Mature woods; dense coniferous, deciduous, mixed woodlands; wooded swamps with standing snags with loose bark.	___	G5	S3B/S5N	S3B/S4N	
X	X	*Cistothorus platensis*	Sedge Wren	Augusta, Bath, Bland Cos.	Wet meadows; damp, tall-grass meadows with scattered bushes.	___	G5	S1B/S1S2N	S1B	
X	X	*Contopus cooperi*	Olive-sided Flycatcher	Highland, Nelson, Smyth Cos.; Mt Rogers, Grayson, Smyth Cos.	Northern and montane coniferous forests.	___	G4	SHB	S1B	Synonym: *Nuttallornis borealis.*
X	X	*Empidonax alnorum*	Alder Flycatcher	Mt Rogers, Grayson Co. since 1974; Blacksburg; Bath, Highland, Tazewell Cos.	Alder swamps; near water in dense, low, damp thickets of alders, willows, sumacs, viburnum, elderberry, and red-osier dogwood.	___	G5	S1S2B	S3B	
_	X	*Empidonax flaviventris*	Yellow-bellied Flycatcher	Summer records since 1973, Mount Rogers, Grayson, Smyth Cos.	Predominantly Spruce-Fir forests. Low, swampy thickets bordering ponds and streams; sphagnum bogs; alder swamps; wet mossy glades; cool, moist mountain sides.	___	G5	S1B	SHB	
X	X	*Falco peregrinus*	Peregrine Falcon	Hack sites late 80s and early 90s – Mt Rogers, Grayson; Cole Mtn, Amherst; Big Schloss, Shenandoah; Elliot Knob, Augusta; High Knob, Rockingham Cos. No nests, current migrant.	Nests on ledges or cliffs, buildings, bridges, quarry walls. Non-breeding sites, farmland, open country, lakeshores, broad river valleys, airports, cities.	T	G4	S1B/S2N	S1B/S2N	
X	X	*Geothlypis philadelphia*	Mourning Warbler	Locust Springs, Highland Co.; Elliott Knob, Augusta Co.; Paddy Knob, Bath Co.; Mount Rogers, Grayson, Smyth Cos.	Brushy, woodland clearings; forest edges; brushy edges of marshes and bogs; dense second-growth thickets.	___	G5	S1B	S3B	Synonym: *Oporornis philadelphia.*
X	X	*Haemorhous purpureus*	Purple Finch	Highland Co; Mt. Rogers and Whitetop Mtn, Grayson, Smyth, Washington Cos	Spruce-Fir forests.	___	G5	S1B/S5N	S4B/S4N	Synonym: *Carpodacus purpureus.*
X	_	*Haliaeetus leucocephalus*	Bald Eagle	Potomac R, James R, New R, Upper Tennessee watersheds.	Feeds and nests on or near large lakes and rivers.	___	G5	S3S4B/S3S4N	S2B/S3N	2016 VA-DCR/DNH, Rare Animals List: Grank (G5), VA SRank (S3B/S3N).
X	_	*Lanius ludovicianus migrans*	Migrant Loggerhead Shrike	Ridge & Valley (Shenandoah Valley).	Open grasslands with trees and shrubs, fencerows.	T	G4T3Q	S1	S1B/S2N	2016 WV-DNR/WDU, Rare Animals List: Grank (G4T3Q), WV SRank (S1B/S1N).
_	X	*Limnothlypis swainsonii*	Swainson's Warbler	Holston, Big Sandy drainages of the southwestern mountains; most abundant in Breaks SP, Dickenson Co.; Whitetop, Mt. Rogers, Smyth Co.; Wise Co.	Moist lower slopes of mountain ravines (≤ 2800') of Rhododendron and laurel species; sawtimber, pole stands of second-growth cove forests; Dense understory, vegetation.	___	G4	S2B	S3B	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	X	*Loxia curvirostra*	Red Crossbill	Glen Alton, Giles Co.; Mt Rogers, Whitetop Mtn, Grayson, Smyth Cos.; Highland Co.; Shenandoah Mt. Area, Rockingham Co.	Associated with, but not confined to conifers; northern hardwood hemlocks and red spruce; On Shenandoah Mt in pine-oak woods.	___	G5	S1	S2N	2016 WV-DNR/WDU, Rare Animals List: Grank (G5), WV SRank (S2B/S2N).
X	_	*Melospiza georgiana georgiana*	Swamp Sparrow	Highland Co.	Prefers swampy wetlands with emergent vegetation; wetlands with bushes, brushy wet meadows, sloughs, bogs, swamps, freshwater marshes, along swampy shorelines of lakes.	___	G5T5	S1B/S4S5N	S3B/S4N	
X	X	*Oreothlypis ruficapilla*	Nashville Warbler	Augusta, Highland, Rockingham, Shenandoah, Warren Cos.; Mount Rogers, Grayson, Smyth Cos. No confirmed breeding records, but three adults with one fully fledged juvenile, 1986, Elliot Knob, Augusta Co.	Brushy sphagnum bogs, open second-growth woodlands, burned or cut areas, overgrown pastures, fields, woodland edges.	___	G5	S1B	S1B	Synonym: *Vermivora ruficapilla.*
X	X	*Parkesia noveboracensis*	Northern Waterthrush	Northwestern Highland Co.; Bath Co.; Peaks of Otter area; Mt Rogers, Grayson, Smyth, Washington Cos.	Cool, shady, wet, brushy areas with open pools and thickets along edges of swamps, ponds and wooded streams with numerous fallen trees. Woodlands and shrubs around standing water.	___	G5	S1B	S2B	Synonym: *Seiurus noveboracensis.*
X	X	*Regulus satrapa*	Golden-crowned Kinglet	Mt Rogers, Grayson Co.; Highland, Smyth, Washington, Wythe Cos.	Spruce-Fir forests.	___	G5	S2B/S5N	S4B/S4N	
X	X	*Setophaga cerulea*	Cerulean Warbler	Peaks of Otter area Bedford, Botetourt Cos.; Bath, Craig, Dickenson, Giles, Lee, Scott, Wise Cos.	Shady, mature upland woods. Prefers forests with tall deciduous trees and little undergrowth.	___	G4	S3S4B	S2B	Synonym: *Dendroica cerulea.*
X	X	*Setophaga fusca*	Blackburnian Warbler	Augusta Co.; Mountain Lake, Giles Co.; Laurel Fork, Highland Co.; Mount Rogers, Smyth, Grayson Cos.; Russell Co.	Upper canopy of mature conifer forests with few deciduous trees with sparse understory; shrubs around forest edges.	___	G5	S2B	S3B	Synonym: *Dendroica fusca.*
X	X	*Setophaga magnolia*	Magnolia Warbler	Northwestern Highland Co; Mt Rogers, Grayson, Smyth, Washington Cos; Russell, Scott Cos	Open coniferous or mixed coniferous-deciduous woodlands. Spruce-Fir forests; coniferous bogs; dense thickets of spruce-fir; old clearings with small conifers.	___	G5	S2B	S4B	Synonym: *Dendroica magnolia.*
X	X	*Sitta canadensis*	Red-breasted Nuthatch	Mt Rogers, Grayson, Smyth, Washington Cos.; Highland, Rockingham, Russell Cos.	Prefers coniferous forests, but sometimes occurs in mixed and deciduous woodlands.	___	G5	S2B/S4N	S4B/S4N	
X	X	*Sphyrapicus varius*	Yellow-bellied Sapsucker	In VA, rare and local summer resident. Amherst, Augusta, Bath, Highland Cos.; Mt Rogers, Grayson, Smyth Cos.	Deciduous, mixed deciduous-coniferous forests and woodlands with poplars. Usually > 3500'. Dead or live trees with heart rot for cavity nests.	___	G5	S1B/S4N	S1B/S3N	2016 WV-DNR/WDU, Rare Animals List: Grank (G5), WV SRank (S2B/S3N).
X	X	*Troglodytes hiemalis*	Winter Wren	Alleghany, Bland, Craig, Wise Cos.; Mt. Rogers area, Grayson, Smyth, Washington Cos.; Botetourt, Rockingham Cos.	Moist coniferous woodlands with low woody vegetation. Low lying cold bogs and swamps. Favors spruce-forests and dense, mixed and hardwood forests.	___	G5	S2B/S4N	S4B/S4N	Synonym: *Troglodytes troglodytes.*
X	X	*Thryomanes bewickii altus*	Appalachian Bewick's Wren	Historical records in Botetourt, Giles, Highland, Washington Cos.	Thickets, old fields, fencerows, old home sites.	E	G5T2Q	SHB	S1	2016 WV-DNR/WDU, Rare Animals List: Grank (G5T2Q), WV SRank (SX).
X	X	*Vermivora chrysoptera*	Golden-winged Warbler	Augusta, Bath, Botetourt, Giles, Highland, Rockbridge, Tazewell, Washington Cos.	Brushy edge habitats; openings with saplings, forbs, and grasses.	___	G4	S3B	S1B	
Mammal										
X	_	*Lepus americanus*	Snowshoe hare	Known from only three sites in Highland Co.	Spruce-Fir forests.	E	G5	S1	S3	
X	X	*Lontra canadensis*	Northern river otter	Millboro Springs; James R; Cowpasture R; N and S Fk Shenandoah R; Big Otter Ck; New R at McCoy.	Forested wetlands; herbaceous wetlands; riparian areas; scrub-shrub wetlands.	___	G5	S4	S4	Also called North American river otter.
X	X	*Martes pennanti*	Fisher	No evidence of reproducing population in VA. Expanding from WV.	Red spruce and mixed hardwood forests.	___	G5	S1	S3	
X	_	*Microtus chrotorrhinus carolinensis*	Southern rock vole	Alleghany Mtn, Bath Co.	Cool, moist, mossy talus under oaks/northern hardwoods.	E	G4T3	S1	S2	
X	X	*Mustela nivalis*	Least weasel	Upper piedmont and mountains.	Elevations 500'-3800' in pasturelands, brushy fence rows, weedy fence rows between hayfields, old fields.	___	G5	S3	S3	
X	X	*Neotoma magister*	Alleghany woodrat	Range in VA uncertain, sites are being monitored presently to determine status. Seems to be presently found over entire forest.	Rocky areas; Caves; large boulderfields.	___	G3G4	S3	S3	
X	_	*Sorex palustris punctulatus*	Southern water shrew	Alleghany Mtn, Bath Co; Laurel Fork, Highland Co.	Riparian areas within spruce-fir forests and northern hardwoods.	E	G5T3	S1S2	S1	
INVERTEBRATES										
Snail (Mollusk, Class Gastropod)										
X	X	*Fontigens tartarea*	Organ Cave snail	Rock Camp Cave (1 mile from FS), McClung-Zenith Cave (1.5 mile from FS), Monroe Co., WV; Greenbrier, Pocahontas, Randolph, Tucker Cos., WV; Bath, Highland Cos., VA.	Caves. Inhabits cave streams under flat rocks.	___	G2	S1S2	S2	
X	_	*Helicodiscus lirellus*	Rubble coil	Rockbridge Co.	Calciphile; limestone rubble and rich fossiliferous shale talus. Found among leaf litter and limestone stones or talus, or rich shale scree, upon steep, forested slopes which are associated with certain rivers in the upper James River watershed, including Maury R & Kerr's Ck.	E	G1	S1	___	
_	X	*Paravitrea reesei*	Round supercoil	Monroe Co., WV. Grayson, Montgomery, Pulaski, Smyth Cos., VA.	Calcareous woodlands and glades. Prefers moist environments.	___	G3	S2	S2	
Mussel (Mollusk, Class Bivalvia)										
_	X	*Leptodea fragilis*	Fragile papershell	Lee, Russell, Scott, Wise Cos.	Aquatic-streams, rivers.	T	G5	S1	S2	
_	X	*Ligumia recta*	Black sandshell	Lower reaches M Fk Holston R, Washington Co.; N Fk Holston R, Scott Co. near VA/TN border; Clinch R from Dungannon; Scott Co. near VA border	Aquatic-rivers.	T	G5	S2	S2	
_	X	*Truncilla truncata*	Deertoe	Only in Clinch R from Dungannon, Scott Co. to VA/TN border; Powell R from Poteet Ford, Lee Co. to VA-TN line.	Aquatic-rivers.	E	G5	S1	S1	
Spider (Arachnid)										
X	_	*Amaurobius borealis*	An amaurobiid spider	Known from only one site in VA: Tomahawk Mtn, Rockingham Co.	Mixed hardwoods.	___	G5	S1S3	___	
X	_	*Clubiona spiralis*	A two-clawed hunting spider	Known from only one site in VA: Tomahawk Mtn, Rockingham Co.	Mixed hardwoods.	___	G4	S1S3	SNR	Also called a Leafcurling sac spider.
X	X	*Phanetta subterranea*	A cave obligate spider	Ridge and Valley (common and widespread); Frederick to Lee Cos.	Caves.	___	G5	S4	S3	
_	X	*Xysticus emertoni*	Emerton's crab	Whitetop area of Mt. Rogers, Grayson Co	Open meadows.	___	G5	S1S3	___	
Pseudoscorpion (Arachnid, Order Pseudoscorpionida)										
_	X	*Kleptochthonius orpheus*	Orpheus cave pseudoscorpion	Patton Cave, Monroe Co., WV.	Caves.	___	G1	___	S1	
Amphipod (Crustaceans, Order Amphipoda)										
_	X	*Stygobromus cumberlandus*	Cumberland cave amphipod	Lee, Scott, Wise Cos.	Aquatic-caves.	___	G3G4	S1S2	___	
_	X	*Stygobromus estesi*	Craig County cave amphipod	Caves in U Sinking Ck Valley and Potts Ck, Poverty Hollow seeps, Captain seeps.	Aquatic-caves, seeps.	___	G4	S3	___	
_	X	*Stygobromus fergusoni*	Montgomery County cave amphipod	Botetourt, Montgomery Cos.	Aquatic-caves.	___	G2G3	S1	___	

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GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Stygobromus morrisoni*	Morrison's cave amphipod	Bath, Highland Cos., VA; Hardy, Pendleton Cos., WV.	Caves.	___	G2G3	S1S2	S1	
_	X	*Stygobromus redactus*	Patton cave stygobromid	Patton Cave, near Gap Mills, Monroe Co., WV.	Caves. Small, mud-bottomed seep pools.	___	G1	___	S1	
		Stygobromus sp. nov.	an amphipod	Scott Co.	Aquatics - Caves.	___	___	___	___	
X	_	*Stygobromus sp. 7*	Sherando spinosoid amphipod	Endemic to VA, apparently limited to the Sherando/Big Levels area, Augusta Co.	Springs.	___	G2	S2	___	
–	–	*Stygobromus sp. 17*	Massanutten spring amphipod	No data.	No data.	___	G2	S2	___	
–	–	*Stygobromus sp. 18*	Big Levels spring amphipod	No data.	No data.	___	G1?	S1?	___	
_	X	*Stygobromus sp. 19*	an amphipod	Scott Co.	Caves.	___	G1	S1	___	
_	_	*Stygobromus sp. 23*	Shenandoah Mountain spring amphipod	No data.	No data.	___	G1?	S1?	___	
Isopod (Crustaceans, Order Isopoda)										
X	_	*Caecidotea holsingeri*	Greenbrier Valley cave isopod	Ridge and Valley; 10 sites throughout Allegheny, Bath, Giles, Highland Cos., VA.; Greenbrier Co., WV.	Caves and springs.	___	G5	S3	S3	
Millipede (Class Diplopoda)										
_	X	*Brachoria cedra*	Cedar millipede	Jonesville, Lee Co.; High Knob, Wise Co.	Cedar glades. Leaf litter within mixed hardwoods.	___	G2G3	S2S3	___	
_	X	*Brachoria dentata*	Pennington Gap mimic millipede	Known only from Pennington Gap and Cave Spring Recreation Area, Lee Co.	Leaf litter, deciduous forests.	___	G1	S1	___	
_	X	*Brachoria eutypa ethotela*	Hungry Mother millipede	Pine Mtn above Troutdale.	Leaf litter, deciduous forests.	___	GNRTNR	S3	___	
_	X	*Brachoria insolita*	A millipede	Known from only two sites: High Knob area, Scott, Wise Cos.	Leaf litter within mixed hardwoods.	___	G1	S1	___	
_	X	*Buotus carolinus*	A millipede	Brush Mt;, Whitetop Mtn; Apple Orchard Mtn; Tazewell Beartown.	Beech leaf litter, deciduous forests.	___	G3	S3	___	
X	_	*Cleidogona fidelitor*	Faithful millipede	Known from only one site: Mt. Torry Furnace near Sherando Lake, Augusta Co.	Leaf litter within mixed hardwoods.	___	G2G4	S2S4	___	
_	X	*Cleidogona hoffmani*	Hoffman's cleidogonid millipede	Mt Rogers, Whitetop Mtn, Elk Garden; Hamilton cave (private) Bland Co.	Mountaintop species, leaf litter, deciduous forests.	___	G3	S2S3	___	
_	X	*Cleidogona lachesis*	A millipede	Mt Rogers & Whitetop Mtn.	Beech leaf litter, deciduous forests.	___	G2	S1	___	
_	X	*Conotyla aeto*	Aeto millipede	Known from only one site in VA: Burks Garden area, Tazewell Co.	Leaf litter within mixed mesic hardwoods.	___	G1	S1	___	
_	X	*Conotyla celeno*	Celeno millipede	Known from only one site in VA: Comers Rock area of Mt Rogers, Grayson, Wythe Cos.	Leaf litter within mixed hardwoods.	___	G1	S1	___	
_	X	*Dixioria fowleri*	Fowler's millipede	Walker Mtn; Comers Rock on Iron Mtn; Laurel Ck; Damascas; 1/2 mile west of NRA office; Tazewell Beartown.	Leaf litter, deciduous forests.	___	G2T2	S2	___	
_	X	*Dixioria pela coronata*	A millipede	Endemic to Mt Rogers.	Leaf litter, northern hardwood and spruce-fir forests. Altitudinally restricted, >5000'.	___	G2T2	S2	___	
X	_	*Nannaria shenandoah*	Shenandoah Mountain xystodesmid millipede	One site: along Long Run Road, Rockingham Co.	Leaf litter, mixed oak forest.	___	G1	S1	___	
_	X	*Rudiloria trimaculata tortua*	A millipede	Known from only three localized and disjunct sites: Potts Mountain, Craig Co.; Mountain Lake, Giles Co.; Peaks of Otter, Bedford Co.	Leaf litter within mixed hardwoods.	___	G5T2	S2	___	
X	_	*Pseudotremia alecto*	A millipede	Griffith Knob, Alleghany Co.; near Mountain Grove Saltpetre Cave, Bath Co.	Leaf litter, deciduous forests.	___	GNR	SNR	___	
X	X	*Semionellus placidus*	A millipede	Hawksbill Mtn; Apple Orchard Mtn; Tomahawk Mtn.	Leaf litter, deciduous forests.	___	G3	S3 (old rank S2)	___	
_	X	*Zygonopus packardi*	Packards blind cave millipede	Hopkins Cave, Starnes Cave, Giles Co.; Hamilton Cave, Bland Co.; Tawny Cave, (private) Giles Co.	Caves.	___	G4	S3	S2	Synonym: *Trichopetalum packardi.*
X	_	*Zygonopus weyeriensis*	Grand Caverns blind cave millipede	Breathing Cave, Star Chaple Cave, Bath Co.; Mystic Cave, Pendleton Co., WV.	Damp areas in caves on organic debris.	___	G4	S2	S2	Synonym: *Trichopetalum weyeriensis.*
Centipede (Insect, Order Chilopoda)										
X	_	*Nampabius turbator*	A cave centipede	One known site: Low Moor cave, Alleghany Co.	Caves.	___	G1G2	S1	___	
Springtail (Insects, Order Collembola)										
X	_	*Cliforga alleghaniensis*	a springtail	Known from only one site in VA: Warm Springs Mtn, James River RD.	Forested area with predominantly oak, and rhododendron understory.	___	G1?	S1?	___	
X	X	*Pseudosinella gisini virginia*	A cave springtail	Spangler Cave, Indian Burial Cave, Lee Co.; Daugherty Cave, Russel Co.; Greenbrier, Monroe, Pocahontas Cos., WV.	Caves.	___	G3G4T2	S2	___	
X	X	*Pygmarrhopalites carolynae*	A cave springtail	Augusta, Bath, Highland, Lee, Wise Cos.	Caves.	___	G4	S3	___	Synonym: *Arrhopalites carolynae*
-	X	*Pygmarrhopalites commorus*	A cave springtail	Giles, Lee, Wise Cos.	Caves.	___	G2G3	S2S3	S1	Synonym: *Arrhopalites commorus*
Dipluran (Insects, Order Diplura)										
_	X	*Litocampa holsingeri? sp. 4?*	A dipluran	3 caves, Scott Co.	Caves.	___	G2	S1S2	___	
Mayfly (Insect, Order Ephemeroptera)										
-	X	*Leptophlebia johnsoni*	Johnson's pronggill mayfly	One location: Lewis Fk, north slope Mt Rogers.	Aquatic-streams.	___	G4	S1	___	
Damselfly (Insects, Order Odonata)										
X	X	*Calopteryx angustipennis*	Appalachian jewelwing	On island below ford of Craig Ck at Rt. 786, Botetourt Co.; along Passage Ck at Elizabeth Furnace, Shenandoah Co.	Aquatic-streams.	___	G4	S3	S3	
X	_	*Enallagma annexum*	Northern bluet	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, still water.	___	G5	S1	S2	Synonym: *Enallagma cyathigerum.*
X	_	*Enallagma hageni*	Hagen's bluet	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S3	S3S4	
X	_	*Lestes disjunctus*	Northern spreadwing	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S2	S3	
X	_	*Nehalennia intergricollis*	Southern sprite	Maple Flats area, Augusta Co.	Aquatic-ponds, still water.	___	G5	S3	___	
X	_	*Nehalennia irene*	Sedge sprite	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, sphagnum bogs, still water.	___	G5	S1S2	S3	
Dragonfly (Insects, Order Odonata)										
X	_	*Aeshna canadensis*	Canada darner	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, still water.	___	G5	S1	S3	
X	_	*Aeshna tuberculifera*	Black-tipped darner	Pond Flat, Alleghany Co.; Potts Pond, Alleghany, Craig Co.; Maple Flats, Augusta Co.; Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G4	S2S3	S3	2016 VA-DCR/DNH, Rare Animals List: Grank (G4), VA SRank (S2S3).
X	_	*Aeshna verticalis*	Green-striped darner	Buck Run ponds near Locust Springs picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	S2S3	
X	_	*Anax longipes*	Comet darner	Quarles Lake, Big Levels, Augusta Co.	Aquatic-ponds.	___	G5	S3	S3	
X	_	*Arigomphus furcifer*	Lilypad clubtail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	SH	___	
X	_	*Celithemis martha*	Martha's pennant	Spring Pond, Maple Flats area, Augusta Co.	Aquatic-ponds.	___	G4	S2	___	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Cordulegaster diastatops*	Delta-spotted spiketail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	S3S4	
X	_	*Cordulia shurtleffi*	American emerald	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S3	G4	
X	_	*Epitheca canis*	Beaverpond baskettail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	S1	2016 VA-DCR/DNH, Rare Animals List: Grank (G4), VA SRank (SH). Synonym: Gomphus borealis.
X	_	*Gomphus descriptus*	Harpoon clubtail	Shaws Fk at Rt. 250 near Headwaters, Highland Co.	Aquatic-ponds, streams.	___	G4	S1	S3	Animals List: Grank (G4), WV SRank (S2S3).
_	X	*Gomphus fraternus*	Midland clubtail	Phillips Ck, Wise Co.	Aquatic-ponds, streams.	___	G5	S2	S2	
X	X	*Lanthus parvulus*	Northern pygmy clubtail	Highland, Montgomery Cos., VA; Trout Branch, WV.	Aquatic-streams.	___	G4G5	S2	S3	2016 VA-DCR/DNH, Rare Animals List: Grank (G4), VA SRank (S2).
X	_	*Leucorrhinia frigida*	Frosted whiteface	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	SH	___	
X	_	*Leucorrhinia hudsonica*	Hudsonian whiteface	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds.	___	G5	S1	S3	
X	X	*Leucorrhinia intacta*	Dot-tailed whiteface	Buck Run Ponds near Locust Spring picnic area, Highland Co.; Potts bog, Craig Co.	Aquatic-ponds, streams.	___	G5	S3	S4	
X	_	*Ladona julia*	Chalk-fronted corporal skimmer	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S2S3	S4	Also called Chalk-fronted corporal skimmer.
_	X	*Ophiogomphus incurvatus alleghaniensis*	Allegheny snaketail	Rich Ck, Giles Co.	Aquatic-streams.	___	G3T2T3	S1	SX	Synonym: Ophiogomphus alleghaniensis.
X	_	*Phanogomphus borealis*	Beaverpond clubtail	Buck Run Ponds near Locust Spring picnic area, Highland Co.	Aquatic-ponds, streams.	___	G5	S1	SX	
X	X	*Rhionaeschna mutata*	Spatterdock darner	Bullpasture River gorge near Williamsville, Highland Co; Shenandoah Pond, Augusta Co; marsh near Paint Bank, Craig Co.	Aquatic-ponds.	___	G4	S2	S1	Synonym: *Aeshna mutata*.
X	_	*Somatochlora elongata*	Ski-tipped emerald	Bearwallow Run Beaver ponds; Buck Run ponds near Locust Spring Picnic area; headwaters of Slabcamp Run; headwaters of S ranch Locust Spring Run, Highland Co.	Aquatic-ponds, streams.	___	G5	S1S2	S2	2016 WV-DNR/WDU, Rare Animals List: Grank (G5), WV SRank (S3).
X	_	*Somatochlora williamsoni*	Williamson's emerald	Buck Run beaver ponds, Locust Springs, Highland Co.	Aquatic-ponds, streams.	___	G5	SH	___	
X	_	*Sympetrum obtrusum*	White-faced meadowhawk	Bearwallow Run beaver ponds; Buck Run ponds near Locust Spring Picnic area; headwaters of Slabcamp Run, Highland Co.	Aquatic-ponds, streams.	___	G5	S2	S3	
X	_	*Tramea onusta*	Red saddlebags	Green Pond, Big Levels, Augusta Co.	Aquatic-ponds, streams.	___	G5	S1	S1	
Stonefly (Insect, Order Plecoptera)										
_	X	*Acroneuria kosztarabi*	Virginia stonefly	Station Spring Ck, Tazewell Co.	Aquatic-streams.	___	G1G2	S1S2	___	
_	X	*Isoperla major*	Big stripetail stonefly	Burkes Garden, Tazewell Co.	Aquatic-streams.	___	G1	S1	___	
Beetle (Insects, Coleoptera)										
X	X	*Cicindela ancocisconensis*	Appalachian tiger beetle	Alleghany, Bath, Highland, Lee, Rockbridge, Washington, Wise Cos.	Riparian - sandy/silty edges of streams and rivers.	___	G3	S2	S3	
_	X	*Cyclotrachelus incisus*	A ground beetle	Breaks Interstate Park, Dickenson Co. Not on GWJ property.	Dry, well drained site, red maple, magnolia, mountain laurel.	___	G4	S1	___	
X	X	*Hydraena maureenae*	Maureen's hydraenan minute moss beetle	Alleghany, Bath, Botetourt, Bland, Craig, Cos.	Interstitial water in riparian-shale substrate along stream edge.	___	G2?	S2?	___	
_	X	*Pseudanophthalmus fuscus*	A cave beetle	Flecher's, Fulton, Patton caves, Monroe Co, WV.	Caves.	___	G4	___	S2	
X	X	*Pseudanophthalmus hypertichosis*	A cave beetle	Greenbrier, Monroe, Pocahontas, Randolph Cos, WV.	Caves.	___	G5	___	S3	
X	_	*Pseudanophthalmus limicola*	Maddens cave beetle	Bakers Cave, Rockingham Co; Maddens Cave, Shenandoah Wild Cave, Shenandoah Caverns, Shenandoah Co.	Caves.	___	G1G2	S1	___	
X	_	*Pseudanophthalmus nelsoni*	Nelson's cave beetle	Arritt Mill Tunnel Cave, Blue Spring Cave, Alleghany Co.	Caves.	___	G1G2	S1	___	
X	_	*Pseudanophthalmus petrunkevitchi*	Petrunkevitch's cave beetle	Woods Cave, Page Co.; Skyline Caverns, Woods Cave, Warren Co.	Caves.	___	G1G2	S1	___	
X	X	*Sphaeroderus schaumii*	Schaum's false snail-eating beetle	Range in VA is disjunct and localized. Front Royal, Hawksbill Mountain; trail to Apple Orchard Falls, Bedford Co.	Mixed hardwoods.	___	G4	S2	___	
Caddisfly (Insects, Order Tricoptera)										
X	_	*Nemotaulius hostilis*	A limnephilid caddisfly	Buck Run beaver ponds, Locust Springs, Highland Co.	Boreal type wetlands, beaver ponds.	___	G5	S1	SNR	
Butterfly (Insects, Order Lepidoptera)										
X	X	*Boloria selene*	Silver-bordered fritillary	Bath, Giles, Highland, Nelson Cos.	Herbaceous wetland, scrub-shrub wetland.	___	G5	S2	S3	
X	X	*Callophrys polios*	Hoary elfin	Augusta, Highland, Roanoke Cos.	Rocky slopes and ridges; outcrops, dry rocky forests and forest edges; acid bogs.	___	G5	S1S3	SH	Synonym: *Incisalia polia*.
X	_	*Colias interior*	Pink-edged sulphur	In VA, records are only from higher mountains of Highland Co.	Canadian Life Zones with acidic soils; > 3280'; forest openings; beaver meadows; rocky balds; upland dry fields; heaths; barrens; burn scars.	___	G5	S1S2	S1	
X	X	*Euchloe olympia*	Olympia marble	Augusta, Frederick, Giles, Highland, Lee, Rockingham, Shenandoah Cos.	Shale barrens and slopes; openings and right of ways.	___	G5	S2	S1	2018 VA-DCR/DNH, Rare Plants List: Grank (G4G5), VA SRank (S2).
X	X	*Phyciodes batesii*	Tawny crescent	No data.	Moist meadows and pastures in northern part of range; dry rocky sparsely wooded ridges or hillsides.	___	G5	SH	SX	
X	X	*Phyciodes batesii batesii*	Tawny crescent	Mountain Lake, Giles Co; Bedford, Botetourt, Frederick Cos.	Moist meadows and pastures in northern part of range; dry rocky sparsely wooded ridges or hillsides.	___	G4G5T1	SX	___	List: Grank (G4T1), VA SRank (SX).
X	_	*Phyciodes cocyta*	Northern crescent	Augusta, Bath Cos.	Shale barrens; bare rock/talus/scree; old fields; mixed conifer-hardwood forests.	___	G5	S1S3	S2	
X	_	*Speyeria atlantis*	Atlantis fritillary	Augusta, Highland Cos.	Canadian Life Zones; cool open woods; along woodland streams; upland pastures; clearings.	___	G5	S2	S2S3	
X	X	*Speyeria diana*	Diana fritillary	Blue Ridge, Ridge & Valley.	Grasslands-shrublands, near streams with thistles and milkweeds. Larval host plant, violets, *Viola* spp.	___	G3G4	S3	S2	
Skipper (Insects, Order Lepidoptera)										
X	X	*Euphyes bimacula*	Two-spotted skipper	Augusta, Highland, Montgomery Cos.	Bogs/fens; herbaceous wetlands; shrub wetlands.	___	G4	S2	S1	
Moth (Insects, Order Lepidoptera)										
_	X	*Anaplectoides brunneomedia*	Brown-lined dart moth	Grayson Highlands, Giles, Smyth Cos.	Mountains at high elevations.	___	G4	S2	SU	
_	X	*Catocala marmorata*	Marbled underwing	Montgomery Co.	Breeding: mainly riparian forest areas; mostly mature, mesic hardwood forests.	___	G3G4	S2	___	
X	X	*Catocala pretiosa pretiosa*	Precious underwing	Blue Ridge, Ridge and Valley.	Headwaters swamps; wet swales in pine barrens.	___	G4T2	SH	___	
X	_	*Psectrotarsia hebardi*	Hebard's noctuid moth	Bath Co.	Rich, mesic hardwood forest. Larvae host plant, Canada horse-balm, *Collinsonia canadensis*.	___	GU	SH	___	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
_	_	*Synanthedon castaneae*	Chestnut clearwing moth	No data.	Mixed hardwoods; Prefers Quercus and Castanea.	___	G3G5	SH	___	
Bee (Insect, Order Hymenoptera)										
_	_	*Bombus terricola*	Yellow-banded bumble bee	No data.	Select food plants: Vaccinium, Salix (Willows), Rosa (Roses), Rubus, Lonicera (Honeysuckles), Solidago (Goldenrods), Asters.	___	G3G4	SU	___	2016 VA-DCR/DNH, Rare Animals List: Grank (G2G4), VA SRank (SU).
NON-VASCULAR PLANTS										
Lichen										
X	_	*Arctoparmelia centrifuga*	Concentric ring lichen	Pendleton, Tucker Cos, WV.	High elevations. Arctic/boreal disjunct. Saxicolous (grows on rocks).	___	G5	S1	___	
X	_	*Buellia stellulata*	Button lichen	Blue Ridge; Shenandoah National Park.	Disjunct from the western US.	___	GNR	S1	___	Also called Disc lichen.
_	X	*Cetrelia monachorum*	Sea-storm lichen	Mt. Rogers, Grayson, Smyth Cos.	High elevation, spruce fir forests. Collected on Fagus.	___	G2G4	SU	___	List: Grank (G2G4), VA SRank (SH).
X	X	*Cladonia coccifera*	A cladonia	Blue Ridge; Shenandoah National Park.	Arctic/Boreal species disjunct in higher Appalachians. Found on soils and humus covered rocks in open woods.	___	G5	S1?	___	Also called Cup lichen.
_	X	*Hypotrachyna livid escens*	A loop lichen	Near Raven Cliff Karst Area, just southwest of Collins Cove Horse Camp; 2.1 mile south of intersection with Pope Rd.; along Cole Branch Drive, Washington Co.; Abrams Falls, NW of Bristol. Grayson, Wythe, Washington Cos.	No data.	___	GNR	S1	___	
X	_	*Melanelia stygia*	Alpine camouflage lichen	Pendleton Co, WV.	On exposed rocks in eastern Canada and New England southward in the mountains to TN.	___	G5	S3?	S2	Also called Stygian black-parmelia.
X	_	*Parmelia omphalodes*	Smoky crottle	Page Co.	No data.	___	G5	S2	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G2G4), VA SRank (S2?). Also called Smoky shield lichen.
X	X	*Peltigera hydrothyria*	Hydrothyria lichen	Augusta, Amherst, Alleghany, Bedford, Botetourt, Giles, Highland, Madison, Nelson, Rockbridge, Shenandoah, Smyth, Wythe Cos. VA.; Pendleton Co WV.	Aquatic - in streams/springs/cascades. Grows at or below water level in cool, clear, partially-shaded streams.	___	G4	S1	___	Synonym: *Hydrothyeria venosa*.
X	_	*Porpidia lowiana*	A boulder lichen	Blue Ridge; Shenandoah National Park.	Arctic / Boreal disjunct. Grows on acid rocks.	___	G2G3	S1	___	
X	_	*Porpidia tuberculosa*	A boulder lichen	Blue Ridge; Shenandoah National Park.	Arctic / Boreal disjunct. Grows on acidic rocks in the open.	___	G2G4	S1	___	
_	X	*Psilolechia clavulifera*	A lichen	Whitetop Mtn, Grayson, Smyth, Washington Cos.	No data.	___	GNR	___	___	2018 VA-DCR/DNH, Rare Plants List: Grank (GNR), VA SRank (S1).
X	_	*Punctelia semansiana*	Speckled shield lichen	Pendleton Co. WV.	No data.	___	GNR	S1	___	Synonym: *Punctelia graminicola.*
X	_	*Stereocaulon glaucescens*	Bony foam lichen	Blue Ridge; Shenandoah National Park; Pendleton Co, WV.	Grows on soil.	___	G4G5	S2?	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G3), VA SRank (S2?). Also called Snow lichen.
_	X	*Usnea angulata*	A beard lichen	0.28 mile SSE of Hale Spring and 6 mile SW of Nicklesville, along Copper Creek, Scott Co.	No data.	___	G3G5	___	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G3G5), VA SRank (S1).
Liverwort										
_	X	*Frullania oakesiana*	A liverwort	Mt Rogers & Whitetop Mtn.	Bark in spruce-fir forests.	___	G3?	S?	___	
_	X	*Metzgeria fruticulosa*	A liverwort	Whitetop Mtn.	Bark in spruce-fir forests, >5000'.	___	G2Q	S?	___	
_	X	*Lejeunea ruthii*	A liverwort	Amherst, Dickenson, Giles Cos.	Occurs most commonly in mixed mesophytic and Oak Hickory forests, but extend into Fraser Fir-Red Spruce climax forest.	___	G3G4	SU	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G3G4), VA SRank (S1).
_	X	*Plagiochasma rupestre*	A liverwort	Giles Co.	Sandstone outcrops in a partially shaded xeric mixed oak-hickory forest.	___	G5	___	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G5), VA SRank (S1).
Moss										
_	X	*Sphagnum angustifolium*	Narrowleaf peatmoss	Giles, Grayson Cos, VA; Greenbrier, Pocahontas Cos, WV	Above water level in open acid bogs; dry margins of open woodland fens.	___	G5	S1S2	S1	
_	X	*Sphagnum capillifolium*	Pom-pom peatmoss	Giles, Grayson, Smyth Cos, VA; Pocahontas Co, WV.	On moist humus and rocks in Spruce Fir forests; uncommon at lower elevations on rock exposures; heath mires and spray waterfalls.	___	G5	S1S2	___	Also called Northern peatmoss.
_	X	*Sphagnum fimbriatum*	A peatmoss	Smyth Co, VA; Pocahontas Co, WV.	Loose carpets along edges in open fens; margins of bogs; spring seeps; on rocks and wet depressions in Spruce Fir forests at high elevations.	___	G5	S3?	___	Also called Fringed bogmoss.
_	X	*Sphagnum flexuosum*	Flexuous Peatmoss	Giles Co. (Wythe Co record needs verification)	Shrub and graminoid bogs; margins of vegetation mats; high elevation Spruce Fir forests.	___	G5	S1S2	___	
_	X	*Sphagnum fuscum*	Brown peatmoss	Giles Co.	Short compact cushions along weak, poor fens.	___	G5	SH	___	
_	X	*Sphagnum girgensohnii*	Girgensohn's Peatmoss	Giles, Washington Cos, VA; Pocahontas Co, WV.	High elevation Spruce-Fir forests forming carpets on humus and large rocks; Possibly at waterfalls.	___	G5	S1S2	___	
_	X	*Sphagnum quinquefarium*	Five-rowed peatmoss	Carroll, Giles, Grayson, Page, Smyth Cos.	Sheltered seepage areas; wet dripping cliffs; sloping banks in mountains; peaty soil in swamps.	___	G5	S4S5	___	Also called Five-ranked bogmoss.
_	X	*Sphagnum rubellum*	Red peatmoss	Giles, Grayson , Smyth Cos, VA; Pocahontas WV.	Hummocks and small carpets in Spruce Fir forests.	___	G5	S2	___	
X	X	*Sphagnum russowii*	Russow's peatmoss	Giles, Grayson, Rockingham Cos.	Cushions and small mats at edges of heath bogs.	___	G5	S3	___	2018 VA-DCR/DNH, Rare Plants List: Grank (G5), VA SRank (S2).
_	X	*Sphagnum subsecundum*	Subsecund peatmoss	Grayson, Tazwell Cos.	No data.	___	G5	S1	___	Also called Orange peatmoss.
_	X	*Sphagnum subtile*	Delicate peatmoss	Giles, Russell Cos, VA; Pocahontas Co, WV.	Small carpets in heath bogs and Spruce-Fir forests.	___	G5	S3	___	
VASCULAR PLANTS										
X	_	*Alnus incana ssp. rugosa*	Speckled alder	Augusta, Nelson, Page Cos.	Wet soil; Streambanks, seeps, seepage swamps.	___	G5T5	S2	S4	
X	_	*Anaphalis margaritacea*	Pearly everlasting	Augusta, Highland, Rockbridge Cos.	Various high elevation habitats, chiefly in dry, open areas.	___	G5	S1	S4	
X	_	*Anemone canadensis*	Canada anemone	Rockingham Co.	Along sandy shores, damp prairies, wet meadows.	___	G5	SH	S1	
X	X	*Anticlea glauca*	White camas	Scott Co, north to Page Co.	Dry calcareous woodlands, barrens and cliffs.	___	G5T4T5	S3	S1	Synonym: *Zigadenus elegans ssp. glaucus.*
_	X	*Arabis glabra*	Tower mustard	Craig, Montgomery, Smyth Cos.	Dry soil. Woodland borders, disturbed habitats.	___	G5	S1	S4	*Synonym: Turritis glabra.*
X	X	*Arabis pycnocarpa var. adpressipilis*	Hairy rockcress	Bland, Rockingham, Shenandoah, Wythe Cos.	Calcareous regions; Woods, hillsides, barrens, cliffs.	___	G5T4Q	S1S2	___	Synonym: *Arabis hirsuta var. adpressipilis.*
X	_	*Aralia hispida*	Bristly sarsaparilla	Augusta, Frederick, Highland, Page, Rockbridge, Shenandoah, Warren Cos.	Dry, usually rocky, woods, especially in sandy or sterile soil.	___	G5	S2	S4	
X	_	*Arethusa bulbosa*	Dragon's mouth	Augusta Co.	Boggy seepage wetlands, shrub swamps, sphagnous hummocks. At foot of western slope along the Blue Ridge.	___	G4	SH	___	
X	X	*Arnoglossum reniforme*	Great Indian-plantain	Alleghany, Amherst, Augusta, Bath, Craig, Dickenson, Shenandoah, Nelson, Gray, Smyth Cos.	Sandy, semi-open alluvial streambanks, often flood-scoured. Edge of young mixed hardwoods.	___	G4	S2	S3	Synonym: *Arnoglossum muehlenbergii.*
X	X	*Asplenium bradleyi*	Bradley's spleenwort	Botetourt, Dickenson, Giles, Rockingham Cos.	Crevices of dry, exposed or partly shaded cliffs and outcrops. Sandstone and felsic metasedimentary rocks.	___	G4	S2	SH	
X		*Astragalus distortus var. distortus*	Ozark milkvetch	Frederick, Shenandoah, Warren Cos.	Shale barrens, shale woodlands.	___	G5T5?	SH	S2	
X	X	*Baptisia australis var. australis*	Blue wild indigo	Augusta, Bedford, Frederick, Giles, Page, Rockingham, Rockbridge, Pulaski, Scott, Shenandoah Cos.	Woodland borders, open woods. Moist, usually rocky or gravelly soil.	___	G5T3T4	S3	S3	
X	_	*Betula papyrifera var. cordifolia*	Paper birch	Augusta, Highland, Page, Rockbridge, Rockingham Cos.	Acidic montain forests and boulderfields of moist or dry soil, usually associated with some presence of fire or other disturbance.	___	G5	S2	S1	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
_	X	*Botrychium lanceolatum var. angustisegmentum*	Triangle grape fern	Giles, Grayson Cos.	High elevation moist and shady forests, grassy balds, margins of swamps, meadows, bottoms, streambanks and sandy fields. Mostly subacid soils.	___	G5T4	SH	?	
X	X	*Botrychium simplex var. simplex*	Dwarf grape fern	Giles, Grayson, Page, Shenandoah Cos.	Mesic and dry-mesic forests.	___	G5T5	S1	SNR	
_	X	*Bromus ciliatus*	Fringed brome grass	Grayson, Highland Cos.	Seepage slopes, moist woods, other wet sites.	___	G5	S1	S4	
X	_	*Bromus kalmii*	Arctic brome	Augusta, Bath, Highland Cos.	In VA, small scattered colonies (2600'-3600') along sandstone ridge crests, noses of slopes in thin oak woods, openings.	___	G5	S1	S5	
X	X	*Calopogon tuberosus*	Tuberous grass-pink	Ridge and Valley; Blue Ridge; Shenandoah, Warren Cos south to Lee Co, west to Grayson Co.	Bogs, fens, seeps. Basic and acidic substrates.	___	G5	S2	S1	
X	X	*Camassia scilloides*	Wild hyacinth	Bath, Giles, Highland, Rockbridge, Scott, Smyth, Washington Cos.	Moist open woods, wet woods, thickets.	___	G4G5	S2	S4	
X	X	*Campanula rotundifolia*	Harebell	Giles, Rockbridge Cos.	Dry woods, barrens, cliffs, outcrops of calcareous substrates.	___	G5	S1	S2	
_	X	*Cardamine flagellifera*	Blue Ridge	Blue Ridge, Ridge & Valley, S of New R watershed.	Riparian, spring seeps, rocky streamsides.	___	G3	SH	S2	
X	_	*Carex aquatilis*	Aquatic sedge	Big Levels, Augusta Co.	Shallow water, wet soil, peat.	___	G5TNR	S1	S1	
X	_	*Carex arctata*	Black sedge	Highland Co.	Moist rich woods of hardwood and spruce.	___	G5	S1	S1	
_	X	*Carex barrattii*	Barratt's sedge	Augusta Co.	Sinkhole ponds.	___	G4	S2	___	
X	X	*Carex buxbaumii*	Brown bog sedge	Augusta, Bath, Giles, Nelson, Rockingham Cos.	Calcareous and mafic fens, peat-bogs, marshes, wet meadows, seeps.	___	G5	S2	S2	
X	X	*Carex conoidea*	Field sedge	Bath, Grayson, Highland, Washington Cos.	Calcareous and mafic fens, saturated meadows, old fields of calcareous substrates.	___	G5	S1S2	S1	
X	X	*Carex cristatella*	Crested sedge	Augusta, Bath, Bland, Giles, Grayson, Montgomery, Tazwell, Smyth, Washington Cos.	Low, calcareous wet meadows, open swamp areas, seeps.	___	G5	S1?	S4	
_	X	*Carex flava*	Yellow sedge	Dismal Creek, Giles Co.	Wet places in calcareous areas.	___	G5	S1	___	
X	X	*Carex interior*	Inland sedge	Augusta, Bland, Grayson, Highland, Montgomery, Washington Cos.	Calcareous seeps, fens, wet meadows.	___	G5	S1	S1	
X	_	*Carex lasiocarpa var. americana*	Slender sedge	Augusta Co.	Acidic, semipermanently flooded sinkhole pond.	___	G5T5	S1	S1	
_	X	*Carex lucorum var. austrolucorum*	Appalachian woodland sedge	Grayson , Lee, Scott, Smyth Cos.	Dry, open woods of oak, pine, or *Fagus.*	___	G4T3T5	S3	S1	
X	_	*Carex lupuliformis*	False hop sedge	Amherst Co.	Floodplain forest, ephemeral pools.	___	G4	S2	S2	
_	X	*Carex manhartii*	Blue Ridge purple sedge	Grayson, Smyth Cos.	High elevation northern hardwood forests.	___	G3G4	S1	S1	
_	X	*Carex oklahomensis*	Sooner sedge	Giles Co.	Calcareous meadows, seeps.	___	G4	SNA?	___	
X	_	*Carex ormostachya*	Necklace spike sedge	Augusta Co.	Northern hardwood forests.	___	G4	S1	S1	
_	X	*Carex pallescens*	Pale sedge	Wilburn Ridge, Mt. Rogers, Grayson Co.	Meadows, grassy woodland edges, glades.	___	G5	S1	___	
X	X	*Carex pedunculata var. pedunculata*	Longstalk sedge	Scott to Montgomery Cos.; Rockbridge to Rockingham Cos.	Rich woods to rocky bluffs, usually in calcareous to mafic soils.	___	G5TNR	S3	S2	
_	X	*Carex purpurifera*	Limestone purple sedge	Lee, Russell, Scott, Wise Cos.	Rich cove woods, dry calcareous woods.	___	G4?	S3	S1	
X	X	*Carex roanensis*	Roan Mountains sedge	Augusta, Smith, Tazwell, Wise, Washington Cos.	Dry-mesic, rocky, oak, oak-hickory and mixed hardwood forests. Middle to high elevations.	___	G2G3	S2	S1	
_	X	*Carex ruthii*	Ruth's sedge	Grayson, Smyth, Tazwell, Wise Cos.	High elevations: Bogs, seeps, streambanks, seepage swamps.	___	G3	S3	___	
X	X	*Carex tetanica*	Rigid sedge	Washington to Montgomery Cos; Allegheny, Augusta, Frederick, Highland, Shenandoah Cos.	Low woods, calcareous fens, spring marshes, meadows.	___	G4G5	S3	S1	
X	X	*Carex vesicaria*	Inflated sedge	Amherst, Botetourt, Bath, Craig, Grayson, Wythe Cos.	Wet soil or shallow water in bogs, swamps, marshes, depression ponds, streams, seeps, springs.	___	G5	S1S2	S2	
X	X	*Chenopodium foggii*	Fogg's goosefoot	Alleghany, Bath, Giles, Rockingham, Shenandoah Cos.	Dry, rocky open forests and woodlands. Shale or calcareous sandstones. Often among oak-hickory vegetation.	___	G2G3	S1?	___	
X	X	*Cheilanthes castanea*	Chestnut lip fern	Alleghany, Giles , Montgomery, Page, Pulaski, Rockbridge, Shenandoah, Wythe Cos.	Dry exposed outcrops, shales; Calcareous sedimentary and metamorphic substrates.	___	G5?	S2	S2	
_	X	*Cheilanthes eatonii*	Eaton's lipfern	Giles Co?	Calcareous or metamorphic substrates; Cliffs, in crevices, on shale or talus slopes.	___	G5?	S2	S2	Synonym: *Cheilanthes castanea.*
X	X	*Cirsium altissimum*	Tall thistle	Botetourt, Giles, Shenandoah Cos.	Forests, rich thickets, river-banks, woods, fields, clearings.	___	G5	S1	S4	
X	X	*Clematis catesbyana*	Satin-curls	Augusta, Giles, Lee, Russell, Smyth, Tazwell, Wise Cos.	Woodlands, outcrops, clearings and roadsides. Calcareous substrates.	___	G4G5	S1	___	
X	X	*Clematis occidentalis var. occidentalis*	Purple clematis	Allegheny, Augusta, Giles, Highland, Montgomery, Page, Shenandoah, Warren Cos.	High elevation forests, rock outcrops, clearings, roadsides.	___	G5T5	S2	S2	
_	X	*Collinsia verna*	Eastern blue-eyed Mary	Giles, Russell, Scott, Smyth, Washington Cos.	Rich sites. Moist woods, often along streams, especially in alluvial soil. Ocassionally in early successional habitats.	___	G5	S2	S4	
X	X	*Coreopsis verticillata*	Whorled coreopsis	Ridge and Valley; Wythe Co to Frederick Cos.	Dry sites. Upland woods, barrens, clearings,	___	G5	S4S5	S1	
X	_	*Cornus canadensis*	Bunchberry	Bath, Highland, Rockbridge Cos.	Damp, cool woods at high elevations.	___	G5	S1	S3	
X	X	*Cornus obliqua*	Silky dogwood	Botetourt, Frederick, Scott Cos.	Flood-scoured rocky river shores and outcrops.	___	G5	S1	S4	
X	X	*Cornus rugosa*	Roundleaf dogwood	Augusta, Craig, Giles, Highland, Rockbridge, Shenandoah Cos.	Rocky forests, boulderfields.	___	G5	S1	S1	
_	_	*Cornus stolonifera = Cornus sericea*	Red-osier dogwood	Botetourt Co.	Riverbanks, shores.	___	G5	S1	SNA	
X	X	*Crataegus calpodendron*	Pear hawthorn	Allegheny, Amherst, Page, Pulaski, Smyth, Wise Cos.	Basic or calcareous substrates: Open woods, thickets, usually along small rocky streams.	___	G5	S1	S1	
_	X	*Crataegus mollis var. mollis*	Downy hawthorn	Botetourt, Montgomery, Roanoke, Wise Cos.	Mesic to dry upland forests, clearings and old fields.	___	G5TNR	S1	SH	
X	X	*Crataegus pruinosa*	Prunose hawthorn	Ridge and Valley; Blue Ridge, except far southwest VA.	Thickets, fields, rocky ground. Middle elevations.	___	G5	SNA	S4	
X	X	*Crataegus succulenta var. succulenta*	Fleshy hawthorn	Alleghany, Craig, Highland, Montgomery, Wyth, Page, Smyth, Tazwell Cos.	Old fields, pastures, clearings, forest edges. Occasionally on forested slopes and ridges.	___	G4G5TNR	S1	SH	
X	_	*Crocanthemum bicknellii*	Plains frostweed	Augusta, Highland, Rockingham Cos.	Mafic to calcareous substrates. Dry rocky, sandy or argillaceous open woods, clearings, shales.	___	G5	S1	S1	Synonym: *Helianthemum bicknellii.*
X	_	*Crocanthemum propinquum*	Low frostweed	Augusta Co.	Dry open woodlands, outcrops, and barrens.	___	G4	S1	S1	Synonym: *Helianthemum propinquum.*
X	_	*Cuscuta cephalanthi*	Buttonbush dodder	Bath Co.	Alluvial swamps, wet clearings. Primarily on woody hosts. On herbacious *Asteraceae.*	___	G5	SH	___	
X	X	*Cuscuta coryli*	Hazel dodder	Augusta, Bath, Giles, Page, Rockingham, Russell, Warren Cos.	On various shrubs and herbs. Dry open forests, rocky woodlands and barrens.	___	G5?	S2?	SH	
X	X	*Cuscuta rostrata*	Beaked dodder	Bath, Buchanan, Giles, Highland, Rockbridge, Russell, Smyth, Tazwell, Washington Cos.	Herbacious hosts. High elevation forests and clearings in the mountains.	___	G4	S2	S2	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Cyperus dentatus*	Toothed flatsedge	Augusta Co.	Seasonal soils in sinkhole ponds.	___	G4	S1	SNR	
X	_	*Cyperus houghtonii*	Houghton's flatsedge	Page Co.	Exposed outcrops.	___	G4?	SH	S1	
X	X	*Cypripedium reginae*	Showy lady's-slipper	Giles, Page, Rockingham, Warren, Washington Cos.	Calcareous soils. Bogs, seeps, swamps, wet woods.	___	G4	S1	S1	
_	_	*Cystopteris tennesseensis*	Tennessee bladder fern	Pulaski, Montgomery Cos.	Mesic to xeric calcareous outcrops.	___	G5	S1	S3	
X	X	*Desmodium canadense*	Showy tick-trefoil	Augusta, Bland, Rockbridge, Russell, Washington Cos.	Calcareous substrates: Fens, wet meadows.	___	G5	S1	S4	
X	X	*Desmodium cuspidatum var. cuspidatum*	Toothed tick-trefoil	Ridge and Valley; Blue Ridge; Scott Co. to Augusta, Nelson Cos.	Dry forests, woodlands, barrens. Calcareous substrates.	___	G5T5?	S2	S4	
X	_	*Desmodium sessilifolium*	Sessile-leaf tick-trefoil	Augusta, Rockingham, Shenandoah Cos.	Dry to mesic woodlands, clearings, meadows.	___	G5	S2	___	
_	X	*Dichanthelium annulum*	Ringed panic grass	Craig, Giles, Lee Cos.	Dry open forests, woodlands, barrens, clearings. Rocky, sandy, hardpan soils. Usually over mafic or calcareous substrates.	___	G3G4	S2	___	
X	_	*Drymocallis arguta*	Tall cinquefoil	Northwest of Laurel Springs Gap, Augusta Co.; Nelson Co.	Dry, rocky woodlands over metabasalt.	___	G5	S1	SX	Synonym: *Potentilla arguta*.
X	X	*Eleocharis compressa var. compressa*	Flattened spikerush	Lee, Montgomery, Page, Warren Cos.	Riverside outcrops, seeps, depression ponds, swamps.	___	G4	S2	S2	
_	X	*Eleocharis intermedia*	Matted spikerush	Montgomery, Pulaski, Russell, Tazwell, Wythe Cos.	Calcareous fens, seeps, pools, depressions, ruts, other disturbed areas.	___	G5	S1	S1	
X	_	*Eleocharis melanocarpa*	Black-fruited spikerush	Maple Flats area, Augusta Co.; Rockingham Co.	Herb-dominated seasonal wetlands in limestone sink basins; Depression ponds.	___	G4	S2	___	
X	_	*Eleocharis robbinsii*	Robbins spikerush	Augusta Co.	Shallow ponds, dead-waters, peaty pools; Shenandoah sinkhole ponds.	___	G4G5	S1	___	
X	_	*Elymus canadensis var. canadensis*	Nodding wild rye	Giles, Rockbridge, Rockingham, Shenandoah Cos.	River banks, open ground, sandy soil.	___	G5TNR	S2?	S5	
X	X	*Elymus trachycaulus ssp. trachycaulus*	Slender wheatgrass	Ridge and Valley; Craig Co. north to Rockingham Co.	Limy soils, prairies, open soils.	___	G5T5	S2	S2	
X	X	*Epilobium ciliatum ssp. ciliatum*	American willow-herb	Ridge and Valley; Blue Ridge; Washington Co. to Shenadoah Co.	Bogs, seeps, wet meadows, wet clearings. High elevations.	___	G5T5	S2	S4	
X	X	*Epilobium leptophyllum*	Bog willow-herb	Bland, Giles, Grayson, Highland, Scott, Smyth, Washington Cos.	Circumneutral soils. High elevation bogs, wet meadows, seeps, other moist soils.	___	G5	S2	S3	
X	_	*Equisetum sylvaticum*	Woodland horsetail	Bath, Frederick, Shenandoah Cos.	Calcareous sites. Seeps, swamps, fens.	___	G5	S1	S1	
X	_	*Eriocaulon aquaticum*	Seven-angled pipewort	Augusta Co.	Peat mats, drawdown shores, ponds, other impoundments.	___	G5	S1	___	
_	X	*Eriocaulon decangulare var. decangulare*	Ten-angled pipewort	Grayson Co.	Bogs, boggy sphagnous clearings, mafic fens and seeps.	___	G3	S2	___	
X	_	*Erysimum capitatum var. capitatum*	Western wallflower	Alleghany, Bath Cos.	Open, dry often rocky, sandy banks and slopes. Open, shaly, southerly slopes below a sandstone scarp. Often on calcareous substrates.	___	G5T5	S2	S1	
_	X	*Fleischmannia incarnata*	Pink thoroughwort	Southwest VA.	Mesic to dry open forests. Calcareous and mafic substrates.	___	G5	S2	S3	Synonym: *Eupatorium incarnatum.*
X	X	*Eurybia radula*	Low rough aster	Bath, Craig, Giles, Page, Scott Cos.	Bogs, streambanks, fens, seeps and other moist places of various soil types.	___	G5	S1	S4	Synonym: *Aster radula.*
_	X	*Eurybia surculosa*	Creeping aster	Oak woods near Flatwoods Job Corps Center, Wise Co; Lee, Pulaski, Scott Cos.	Rocky, usually open, woodland habitats in the mountains. Sandy soils.	___	G4G5	S1	___	Synonym: *Aster surculosus.*
X	X	*Eutrochium maculatum var. maculatum*	Spotted Joe-pye weed	Augusta, Bedford, Craig, Frederick, Highland, Montgomery Cos.	Damp thickets, meadows, spring marshes. Usually in rich or calcareous soils.	___	G5T5	S2	S1	Synonym: *Eupatorium maculatum.*
_	X	*Fimbristylis puberula var. puberula*	Hairy fimbry	Grayson Co.	Mafic fens, wet meadows, wet flatwoods.	___	G5T5?	S1	SNR	
X	X	*Fragaria vesca var. americana*	Woodland strawberry	Bland, Highland, Washington, Wythe, Smyth, Cos.	Dry rocky woodlands, boulder fields, clearings.	___	G5T5	S2?	SNA	
_	X	Gentiana austromontana	Appalachian gentian	Mt Rogers, Whitetop Mtn, High Knob.	High elevation forests and grassy balds.	___	G3	S3	S1	
X	X	*Gentiana linearis*	Narrow-leaf gentian	Ridge and Valley.	Open grassy areas, wet woods, and meadows.	___	G4G5	___	S2	
_	X	*Gentianopsis crinita*	Greater fringed gentian	Bland, Montgomery Cos.	Low woods, wet meadows, brook banks. Calcareous substrates.	___	G5	S1	S1	
X	_	*Geranium robertianum*	Herb Robert	Highland, Page Cos.	Rocky woods on limestone outcrops, boulder fields, roadsides.	___	G5	S3	S2	
X	_	*Geum aleppicum*	Yellow avens	Rockingham Co.	Thickets, meadows, clearings.	___	G5	SH	S1	
X	X	*Glyceria acutiflora*	Sharp-scaled mannagrass	Ridge and Valley; Blue Ridge; Frederick Co. to Wythe Cos.	Depression ponds.	___	G5	S3	S2	
X	X	*Glyceria grandis var. grandis*	American mannagrass	Grayson, Highland Cos.	Banks of streams, wet meadows, ditches. nHigh elevations.	___	G5T5	S1	S2	
X	_	*Pseudognaphalium macounii*	Clammy everlasting	Highland Co.	Dry fields, clearings, pastures, borders of woods.	___	G5	S1	S2	Synonym: *Gnaphalium macounii.*
X	X	*Gnaphalium uliginosum*	Low cudweed	Grayson, Highland, Page, Rockingham Cos.	Ephemeral pools, depressions, ditches, damp clearings, waste places. High elevations.	___	G5	S1	S4	
X	X	*Goodyera repens*	Dwarf rattlesnake-plantain	Ridge and Valley; Blue Ridge; Rockingham C.o to Wise Cos.	Cove and hemlock forests, usually in mossy substrates.	___	G5	S2?	S1S2	
_	X	*Hasteola suaveolens*	Sweet-scented Indian-plantain	Giles, Montgomery, Pulaski Cos.	Riverbanks, wet meadows.	___	G4	S2	S3	
X	X	*Helianthus laevigatus*	Smooth sunflower	Ridge and Valley; Wythe Co. north to Shenandoah Co.	Dry open forests, rocky woodlands, barrens, clearings, road banks.	___	G4	S4	S2	
X	X	*Heuchera hispida*	Purple alumroot	Ridge and Valley, Blue Ridge.	Rocky woods, outcrops, open woods over limestone.	___	G3?	S3?	S2	Synonym: *Heuchera americana var. hispida.*
_	X	*Heuchera longiflora*	Long-flowered alumroot	Far southwest VA.	Upland woods, hillsides, shales, rich woods on limestone substrate; open or shaded areas.	___	G4	S4	S2	
X	X	*Hexalectris spicata var. spicata*	Crested coralroot	Ridge and Valley; Blue Ridge.	Rocky woods, woodland stream margins. Circumneutral, or calcareous soils.	___	G5	S3	S1	
_	X	*Hexastylis contracta*	Mountain heartleaf	Washington Co; Cumberland Plateau, TN; Blue Ridge Mtns, NC.	Mesic cove forests. Acidic substrates.	___	G3	S1	___	
_	_	*Hexastylis lewisii*	Lewis's heartleaf	Piedmont and Coastal Plain.	Upland woods, ravines, streambanks, bog edges, seepage swamps.	___	G3	S3	___	*Synonym: Hexastylis shuttleworthii.*
_	X	*Houstonia canadensis*	Canada bluets	Giles, Lee, Pulaski, Scott, Washington, Wise, Wythe Cos.	Woodlands, openings, rocky woods, hillsides of calcareous substrates.	___	G4G5	S2	S4	
X	X	*Huperzia appressa*	Appalachian fir clubmoss	Mt Rogers, Grayson Co.; Washington, Smyth, Page Cos.	Damp or mossy rocks, barrens, exposed outcrops, sheltered ledges, cold woods, bare mountains, seeps or along banks of small streams at high elevations.	___	G4G5	S2	___	Synonym: *Huperzia appalachiana.*
X	_	*Hypericum boreale*	Northern St. John's-wort	Rockbridge Co. to Rockingham Cos.	Damp peat, sand, shallow water.	___	G5	S2	S4	
X	X	*Hypericum fraseri*	Fraser's marsh St. John's-wort	Alleghany Co north to Highland Co; Giles Co.	Bogs, seeps, swamps, depression ponds.	___	G5	S2	S4	*Synonym: Triadenum fraseri.*
_	X	*Hypericum drummondii*	Drummond's St. John's-wort	Lee, Smyth, Washington Cos.	Dry fields, woods, roadsides, barrens.	___	G5	S3	S1	
X		*Hypericum ellipticum*	Pale St. John's-wort	Alleghany Mountain, Highland Co.	Damp sandy or gravelly shores, wet places.	___	G5	SH	S4	
X	X	*Hypericum mitchellianum*	Blue Ridge St. John's wort	Blue Ridge, Ridge & Valley.	Grassy balds, forest seepages. Moderate to high elevations.	___	G3	S3	S1	
X	X	*Iliamna remota*	Kankakee globe-mallow	Alleghany, Botetourt, Rockbridge, Bedford Cos.	Open, disturbed riverbanks and roadsides.	___	G1Q	S1	___	
X	_	*Isoetes lacustris*	Lake quillwort	Passage Creek, Shenandoah Co.	Gravely shoals in streams. Slow water.	___	G5	S1?	___	
X	_	*Isoetes virginica*	Virginia quillwort	Augusta Co.	Summer-dry sinkhole ponds, seasonally wet upland depressions, and small, wet-weather drains, especially in moss hummocks.	E	G1	S1	___	
_	X	*Juncus articulatus*	Jointed rush	Wise Co. to Bland, Buchanan, Montgomery Cos. to Craig, Highland Cos.	Wet meadows, seeps, gravel bars and shores.	___	G5	S1S2	S2	

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	X	*Juncus brachycephalus*	Small-head rush	Ridge and Valley.	Calcareous fens and seeps.	___	G5	S2	___	
X	X	*Juncus brevicaudatus*	Narrow-panicled rush	Ridge and Valley.	Muddy, or wet places such as bogs and seeps. High elevations.	___	G5	S2	S4	
X	X	*Juniperus communis var. depressa*	Ground juniper	Bath, Grayson, Highland, Rockingham Cos.	Old fields, rock outcrops. Dry soils.	___	G5T5	S1	S2	Synonym: *Juniperus communis.*
X	_	*Lachnanthes caroliniana*	Redroot	Augusta Co.	Peaty shores of natural ponds.	___	G4	SH	___	
_	X	*Leucothoe fontanesiana*	Highland dog-hobble	Bland, Lee, Scott Cos.	Cove forests. Gentle slopes in open deciduous hardwoods.	___	G5	S1S2	___	
X		*Linum lewisii*	Prairie flax	Hardy, Pochahontos Cos, WV.	Prairies, calcareous rocky banks.	___	G5	___	S2	
X	X	*Linum sulcatum*	Grooved yellow flax	Ridge and Valley, Blue Ridge; Lee, Russell, Pulaski Cos. to Warren Co.	Shale barrens, dry rocky woodlands, clearings.	___	G5	S3	S1	
X	X	*Liparis loeselii*	Bog twayblade	Ridge and Valley, Blue Ridge; Dismal Ck, Giles Co.	Damp or wet woods, bogs, fens, seeps, swamps, wet meadows of calcareous substrate.	___	G5	S2	S3	
X	X	*Lithospermum latifolium*	American gromwell	Ridge and Valley; Blue Ridge.	Mesic to dry forests of calcareous substrate.	___	G4	S3	S4	
X	X	*Lithospermum virginianum*	Virginia false-gromwell	Ridge and Valley; Blue Ridge; Roanoke Co. to Augusta Co.	Dry sandy woods, barrens.	___	G4	S2	___	Synonym: *Onosmodium virginianum.*
X	_	*Lonicera canadensis*	American fly-honeysuckle	Highland, Page, Rockbridge, Shenandoah Cos	Moist northern hardwoods and bogs at high elevations, seeps and dry or moist, swamps.	___	G5	S3	S2	
X	X	*Lycopodiella inundata*	Northern Bog clubmossb	Bath, Giles, Highland, Rockingham Cos. to Rockbridge Cos.	Damp peaty or sandy shores, bogs, seeps, swamps, pond edges.	___	G5	S1	S2?	
X	_	*Lycopodiella margueritae*	Marguerite's clubmoss	Bath Co.	Seasonally moist soils, wet acidic ditches, borrow pits.	___	G2	NA	___	
X	_	*Lysimachia radicans*	Trailing loosestrife	Augusta Co.	Wet woods, bottomlands, swamps.	___	G4G5	SH	___	
X	X	*Lythrum alatum*	Winged loosestrife	Augusta, Rockbridge, Warren, Washington Cos.	Calcareous fens, swamps, meadows, prairies, ditches.	___	G5	S2	S2	
_	X	*Magnolia macrophylla*	Bigleaf magnolia	Lee Co.	Mesic, calcareous forests.	___	G5	S1	SNR	
X	X	*Maianthemum stellatum*	Stary Solomon's plume	Ridge and Valley; Russell Co. to Frederick, Warren Cos.	Riverside sand and rockbars, fens, seepage swamps, floodplane forests.	___	G5	S2	S2	
X	X	*Melica nitens*	Three-flower Melic Grass	Ridge and Valley.	Rocky woods, bluffs, dry clearings. Calcareous substrates.	___	G5	S1S2	S1	
_	X	*Micranthes careyana*	Carey's saxifrage	Scott Co.	Sheltered seeps on rock faces.	___	G3	S1	S3	Synonym: *Saxifraga careyana.*
_	X	*Micranthes caroliniana*	Carolina saxifrage	Blue Ridge, Ridge & Valley, S of New R.	Moist, shaded rocks and cliffs.	___	G3	S3	S1	
X	X	*Micranthes pensylvanica*	Swamp saxifrage	Ridge and Valley, Blue Ridge; Botetourt Co. to Warren Cos.; Grayson, Giles Cos.	Forested seeps, seepage swamps. Calcareous mafic substrates.	___	G5	S3S4	S2	Synonym: *Saxifraga pensylvanica.*
X	X	*Minuartia groenlandica*	Mountain sandwort	Spy Rock, Nelson Co.; Lee Co.	Granitic ledges, gravel. High elevations.	___	G5	S1	S1	
X	X	*Muhlenbergia glomerata*	Marsh muhly	Augusta, Grayson, Page, Rockbridge Cos.	Rocky woodlands, barrens, bogs, fens, seeps, marshes, wet meadows. Mafic and ultramafic substrates.	___	G5	S2	SNR	
X	_	*Oryzopsis asperifolia*	Rough-leaved ricegrass	Rockingham Co.	High elevation pine oak heathlands, sandy clearings.	___	G5	S1	S1	
X	_	*Osmundastrum cinnamomeum var. glandulosum*	Glandular cinnamon fern	Blue Ridge; Page Co.	A range of wet habitats from swamps and bogs to high elevation hardwood forests.	___	G5T?	S1	SNR	Synonym: *Osmunda cinnamomea var. glandulosa.*
_	X	*Osmunda x ruggii*	Interrupted royal fern	Single occurrence, Dicks Ck watershed, Craig Co.	Mesic, forested mountainside ravine.	___	GNR	SNR	___	
X	_	*Panicum hemitomon*	Maidencane	Augusta Co.	Swamps, ponds, ditches, marshes, pools, depression ponds.	___	G5?	S2	___	
X	X	*Parnassia grandifolia*	Large-leaved grass-of-parnassus	Augusta Co., Montgomery Co.	Neutral to basic thinly wooded gravely seeps, wet, calcareous soil, fens, bogs, meadows, bases of dripping cliffs.	___	G3	S2	S1	
X	X	*Paronychia virginica var. virginica*	Yellow nailwort	Alleghany, Botetourt, Giles, Wythe Cos.	Rocky places, crevices and ledges, shale barrensand cliffs of calcareous substrates.	___	G4T1Q	S1	S1	
X	X	*Patis racemosa*	Black-seed ricegrass	Ridge and Valley, Blue Ridge.	Rich cove forests.	___	G5	S4	S2	Synonym: *Oryzopsis racemosa.*
X	_	*Penstemon hirsutus*	Hairy beardtoungue	Frederick Co.	Dry rocky woods, clearings, fields of calcareous substrates.	___	G4	S3	S4	
_	X	*Phacelia fimbriata*	Fringed scorpion-weed	Grayson, Smyth, Washington Cos.	Norther hardwoods, cove, alluvial forests.	___	G4	S2	___	
X	X	*Phlox amplifolia*	Large-leaf phlox	Ridge and Valley; Alleghany Co.	Mesic woodlands, hardwood forests of calcareous substrates.	___	G3G5	S2	___	
X	X	*Poa palustris*	Fowl bluegrass	Ridge and Valley, Blue Ridge; Giles Co. north to Augusta Co.	Meadows, rocky shores, marshes of calcareous substrate.	___	G5	S1S2	S4	
X	X	*Poa saltuensis*	Drooping bluegrass	Augusta, Highland, Rockbridge Cos.	Open woods, thickets, recent clearings; northern hardwoods. > 4000'.	___	G5	S2	S1	
X	X	*Polanisia dodecandra var. dodecandra*	Common clammy-weed	Alleghany, Botetourt, Amherst Cos.	Sandy, or gravelly places, especially along the James R.	___	G5T5?	S2	SNA	Synonym: *Polanisia dodecandra.*
X	_	*Potamogeton oakesianus*	Oakes pondweed	Augusta, Rockingham Cos.	Shallow, acidic water along the edges of sinkhole ponds.	___	G4	S2	SH	
_	X	*Prenanthes roanensis*	Roan Mountain rattlesnake-root	Mt Rogers & Whitetop Mtn.	Grassy balds, open high elevation forests and outcrops.	___	G3	S3	___	
_	X	*Prosartes maculata*	Spotted mandarin	Smyth, Tazwell Cos., southwest to Lee Co.	Rich, mesic cove and slope forests, often over calcareous substrates.	___	G3G4	S3	S1	
X	X	*Prunus alleghaniensis var. alleghaniensis*	Alleghany sloe	Ridge and Valley, Blue Ridge; Pulaski Co. to Warren Co.	Clacareous and mafic substrates. Dry uplands, thickets, borders of woods, barrens, rocky woods.	___	G4T4	S3	S3	Synonym: *Prunus alleghaniensis.*
X	X	*Prunus nigra*	Canada plum	Ridge and Valley, Blue Ridge; Montgomery Co. to Warren Co.	Borders of woods, fencerows, old fields.	___	G4G5	S1?	___	
X	_	*Pyrola chlorantha*	Greenish pyrola	Page Co.	Dry, coniferous woods.	___	G5	SH	SH	
X	X	*Pyrola elliptica*	Shinleaf	Tazwell Co. to Shenandoah Cos.	Dry to moist woods, northern red oak and spruce forests.	___	G5	S2	S4	
X	_	*Ranunculus trichophyllus*	White water crowfoot	Hardy Co, WV.	Fresh to brackish waters.	___	G5	SNR	SH	
_	X	*Rhododendron arborescens*	Sweet azalea	Giles, Grayson Cos; Guest River Gorge, Wise Co.	Rocky forests, outcrops, banks of rivers, high gradient streams.	___	G4G5	S2	S4	
_	X	*Rhododendron cumberlandense*	Cumberland azalea	Southern Ridge and Valley.	Montane woodlands, balds, moist exposed slopes, rock outcrops.	___	G4?	S3	SNR	
X	_	*Ribes americanum*	Wild black currant	Rockbridge, Shenandoah Cos.	Stream banks, swamps, calcareous marshes.	___	G5	S1	S4	
X	_	*Ribes lacustre*	Bristly black currant	Pocahantos Co, WV.	Cold woods, swamps.	___	G5	___	S2	
X	X	*Rosa setigera*	Climbing prairie rose	Ridge and Valley; Amherst, Highland, Lee, Montgomery, Scott, Warren Cos.	Open woods, clearings, pastures, fields.	___	G5	S1	S3	
X	_	*Rubus idaeus var. strigosus*	Redraspberry	Ridge and Valley, Blue Ridge; Bath Co to Page Co.	Rocky woods, boulderfields, woodland edges, clearings.	___	G5T5	S2	S4	
_	X	*Rudbeckia triloba var. pinnatiloba*	Pinnate-lobed coneflower	Giles, Montgomery, Smyth, Wise Cos.	Dry calcareous soil of open woods and roadsides.	___	G5T3	S1	___	
X	X	*Ruellia purshiana*	Pursh's wild-petunia	Ridge and Valley, Blue Ridge; Lee Co to Frederick Co.	Dry forests, rocky woodlands, barrens. Calcareous and mafic substrates.	___	G3	S3		
X	X	*Sabatia campanulata*	Slender marsh-pink	Augusta, Grayson Cos.	Bogs, seeps, fens, depression ponds, power line strips, damp sands.	___	G5	S2	___	
_	X	*Sagittaria calycina*	Long-lobed arrowhead	Lee Co.	Mud flats, ponds, seasonally wet pools.	___	G5	S1	S2	Synonym: *Sagittaria calycina var calycina.*
X	X	*Sagittaria rigida*	Sessile-fruited arrowhead	Augusta, Frederick, Giles, Nelson, Page, Pulaski, Rockbridge Cos.	Natural, montane ponds, meadows.	___	G5	S1	SNA	
X	X	*Sanicula trifoliata*	Large-fruited sanicle	Ridge and Valley, Blue Ridge; Scott Co to Shenandoah Co.	Rich cove and slope forests, northern hardwood forests, dry-mesic oak-hickory forests.	___	G4	S4	S5	
_	X	*Sceptridium jenmanii*	Alabama grapefern	Scott, Russell, Wise Cos.	Open woods, old fields, pastures.	___	G3G4	SH	___	Synonym: *Botrychium alabamense.*

GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	VA State Status	GRank	VA SRank	WV SRank	Comments
X	_	*Schizachne purpurascens*	Purple oat grass	Highland Co.	Northern hardwood forests, Spruce-Fir forests, old fields, clearings.	___	G5	S1	S1	
X	_	*Schoenoplectus subterminalis*	Water bulrush	Augusta Co.	Acid waters, sinkhole ponds, quaking bogs, peaty shores.	___	G4G5	S1S2	___	
X	_	*Schoenoplectus torreyi*	Torrey's bulrush	Augusta, Rockingham Cos.	Shallow water in peaty soils of Shenandoah Valley sinkhole ponds.	___	G5?	S1	S1	
X	X	*Scutellaria ovata ssp. rugosa*	Heart-leaf skullcap	Ridge and Valley; Giles, Montgomery Cos to Bath, Rockbridge Cos; Ridge and Valley in WV.	Calcareous woodlands, barrens; Shale, metabasalt substrates.	___	G5THQ	SNA	SNR	Synonym: *Scutellaria ovata ssp. pseudoarguta.*
X	X	*Scutellaria leonardii*	Small skullcap	Ridge and Valley; Frederick Co south to Lee Co.	Barrens, outcrops, grass balds at high elevations. Mafic to felsic substrates.	___	G4T4	S4	S2	Synonym: *Scutellaria parvula.*
X	X	*Sibbaldia tridentata*	Three-toothed cinquefoil	Grayson, Page, Rockingham, Smyth, Washington Cos.	High elevation barrens, outcrops and grassy balds.	___	G5	S2	S2	Synonym: *Sibbaldiopsis tridentata.*
X	X	*Sida hermaphrodita*	Virginia mallow	Ridge & Valley, James R watersheds.	Riverbank glades with loose rock or sandy soil.	___	G3	S1	S3	
_	X	*Silene rotundifolia*	Round-leaf catchfly	Dickenson, Lee, Wise Cos.	Shaded banks, exposed cliffs, rocky ledges and slopes, sandstone cliffs, talus.	___	G4	S2	S1	
X	_	*Solidago rupestris*	Riverbank goldenrod	Page Co.	Rocky riverbanks, openings, cliffs, prairies.	___	G4?	S1	___	
X	_	*Solidago randii*	Rand's goldenrod	Blue Ridge; Warren Co. to Amherst Co.	Primarily over mafic rock. High elevation cliffs, barrens.	___	G4	S2S3	S1	Synonym: *Solidago simplex var. randii.*
X	X	*Solidago rigida var. rigida*	Stiff goldenrod	Ridge and Valley.	Dry rocky woods, barrens, outcrops, clearings, fields with prairie affinities.	___	G5T5	S2	S1	Synonym: *Oligoneuron rigidum.*
X	X	*Solidago uliginosa var. uliginosa*	Bog goldenrod	Grayson, Highland Cos.	Bogs meadows, fens, glades.	___	G4G5T4T5	S2	S4	Synonym: *Solidago uliginosa.*
X	X	*Sparganium emersum*	Narrow-leaf burreed	Bath, Frederick, Giles, Highland, Russell, Washington Cos.	Bogs, beaver wetlands, calcareous marshes. ≥2500'.	___	G5	S1	___	Synonym: *Sparganium chlorocarpum.*
X	X	*Spartina pectinata*	Freshwater cordgrass	Augusta, Bland, Dickenson, Giles, Rockbridge, Wise, Wythe Cos.	Rocky riverbanks, wet meadows, wet open streambanks, swamps, calcareous fens.	___	G5	S2	S4	
X	X	*Spermacoce glabra*	False smooth buttonweed	Bedford, Botetourt Cos.	Rocky river shores.	___	G4G5	S1	S1	
X	X	*Spiranthes lucida*	Shining ladies'-tresses	Ridge and Valley; Washington Co north to Frederick Co.	Calcareous fens and seeps, moist banks, damp meadows.	___	G5	S1	S1S2	
X	X	*Spiranthes ochroleuca*	Yellow nodding ladies'-tresses	Ridge and Valley, Blue Ridge; Warren Co south to Scott Co.	Bogs, meadows, swamps, marshes, wet woods, edge of lakes and streams, peaty and gravelly soil in open barrens, on seepages slopes, forests clearings, meadows. High elevations.	___	G4	S2	S5	
X	X	*Sporobolus neglectus*	Small dropseed	Ridge and Valley, Blue Ridge; Lee Co north to Page Co.	Dry, sterile or sandy soil, mostly open areas. Limestone barrens, cliffs and rocky fields.	___	G5	S2	SNR	
	X	*Stylophorum diphyllum*	Celandine poppy	Ridge and Valley; Roanoke Co south to Lee Co.	Rich woods, often calcareous, cove forests.	___	G5	S2	S4	
X	X	*Symphoricarpos albus*	Common snowberry	Russell Co north to Shenandoah Co	Calcareous ledges, barrens and gravels. Rocky woods and fields.	___	G5T5	S1	S2	
X	X	*Symphyotrichum x schistosum*	Millboro aster	Ridge and Valley. James R drainage, Cowpasture R. Widespread. Occupies all major hydrographic subdivisions of Potomac drainage, except those on lower Piedmont and Coastal Plain. Avoids the Blue Ridge, to which it has ready access.	Shale barrens.	___	GNA	SNA	___	Synonym: *Aster schistosus.*
_	X	*Synandra hispidula*	Gyandotte beauty	Far southwest VA, north to Tazewell Co.	Rich mesic wooded slopes, limestone. Requires permanently moist soil over siltstone, sandstone.	___	G4	S2	S2	
X	X	*Taenidia montana*	Mountain pimpernel	Ridge and Valley, Blue Ridge; Craig, Roanoke, Bedford Cos north to Frederick Co.	Dry woodlands, barrens, outcrops. Open rocky forests. Shale and calcareous sandstone.	___	G3	S3	S3	
X	_	*Triantha racemosa*	Coastal false asphodel	Augusta Co.	Wet sand, clay, bogs.	___	G5	SH	___	*Synonym: Tofieldia racemosa.*
X	X	*Trichostema setaceum*	Narrow-leaf blue curls	Washington, Rockbridge, Bath, Page, Shenandoah, Warren Cos.	Sandstone barrens and outcrops.	___	G5	S2	S2	
X	_	*Trillium pusillum var. moniticulum*	Virginia least trillium	Great North Mtn & Shenandoah Mtn, VA and WV.	Open oak woodlands in well-drained soil and margins of thickets.	___	G3T2	S2	S1	
X	X	*Triphora trianthophora ssp. Trianthophora*	Nodding pogonia	Washington, Grayson Cos north to Rockingham Co.	Damp rich woods, often on rotten logs.	___	G3G4T3T4	S1	S2	
X	X	*Vaccinium macrocarpon*	Cranberry	Augusta, Giles, Grayson Cos.	Open bogs and ponds. Mostly high elevations.	___	G4	S2	S2	
X	_	*Verbena scabra*	Rough vervain	Rockingham Co north to Shenandoah Co.	Swamps, rich low woods and shores.	___	G5	S2	S1	
X	X	*Veronica scutellata*	Marsh speedwell	Augusta, Bath, Grayson Cos.	Bogs, fens, seeps. Calcareous substrates.	___	G5	S1	S2	
X	X	*Viburnum lentago*	Nannyberry	Augusta, Giles, Highland, Page Cos.	Banks of streams, seeps, old fields.	___	G5	S1	S1S2	
X	X	*Vicia americana var. americana*	American purple vetch	Ridge and Valley, Blue Ridge; Washington Co north to Rockingham Co.	Dry shale woodlands, forest edges, clearings, prairies.	___	G5T5	S1S2	S4	
_	X	*Viola walteri var. walteri*	Prostrate blue violet	Botetourt Co south to Russell Co.	Dry woods, rocky ledges, slopes. Calcareous substrates.	___	G4G5TNR	S2	SNR	
X	X	*Woodwardia virginica*	Virginia chain fern	Botetourt, Augusta, Rockingham Cos.	Acid bogs, swamps, wooded bottoms, sinkhole and depression ponds.	___	G5	S5	SNR	

2019 Eastern Region Forester Sensitive Species List - Monongahela National Forest

Species	Common Name
Mammals	
Glaucomys sabrinus fuscus	WV Northern Flying Squirrel
Microtus chrotorrhinus carolinensis	Southern Rock Vole
Myotis leibii	Eastern Small-footed Myotis
Myotis lucifugus	Little Brown Myotis
Neotoma magister	Allegheny Woodrat
Perimyotis subflavus	Tri-colored Bat
Sorex dispar	Long-tailed Shrew
Sorex palustris punctulatus	Southern Water Shrew
Spilogale putorius	Eastern Spotted Skunk
Sylvilagus obscurus	Appalachian Cottontail
Birds	
Accipiter gentilis	Northern Goshawk
Ammodramus henslowii	Henslow's Sparrow
Asio otus	Long-eared Owl
Contopus cooperi	Olive-sided Flycatcher
Falco peregrinus anatum	American Peregrine Falcon
Haliaeetus leucocephalus	Bald Eagle
Lanius ludovicianus migrans	Migrant Loggerhead Shrike
Melanerpes erythrocephalus	Red-headed Woodpecker
Oreothlypis ruficapilla	Nashville Warbler
Parkesia noveboracensis	Northern Waterthrush
Pooecetes gramineus	Vesper Sparrow
Setophaga cerulea	Cerulean Warbler
Setophaga discolor	Prairie Warbler
Vermivora chrysoptera	Golden-winged Warbler
Reptiles	
Crotalus horridus	Timber Rattlesnake
Glyptemys insculpta	Wood Turtle
Virginia valeriae pulchra	Mountain Earth Snake
Amphibians	
Aneides aeneus	Green Salamander
Cryptobranchus alleganiensis	Eastern Hellbender
Pseudotriton montanus	Mud Salamander
Fish	
Clinostomus elongatus	Redside Dace
Etheostoma osburni	Candy Darter
Exoglossum laurae	Tonguetied Minnow
Margariscus margarita	Pearl Dace
Notropis scabriceps	New River Shiner
Pararhinichthys bowersi	Cheat Minnow
Percina gymnocephala	Appalachia Darter
Phenacobius teretulus	Kanawha Minnow
Insects	
Arrhopalites pavo	A Cave Springtail
Brachionycha borealis	Boreal Fan Moth
Calephelis borealis	Northern Metalmark
Callophrys irus	Frosted Elfin
Cicindela ancocisconensis	Appalachian Tiger Beetle
Cicindela patruela	Northern Barrens Tiger Beetle
Cicindela purpurea	Cow Path Tiger Beetle
Danaus plexippus	Monarch

Species	Common Name
Erora laeta	Early Hairstreak
Erynnis lucilius	Columbine Duskywing
Euchlaena milnei	A Geometrid Moth
Gomphus quadricolor	Rapids Clubtail
Gomphus viridifrons	Green-Faced Clubtail
Hadena ectypa	A Noctuid Moth
Hesperia metea	Cobweb Skipper
Lycaena hyllus	Bronze Copper
Pieris virginiensis	West Virginia White
Polygonia faunus smythi	Smyth's Green Comma
Pseudanophthalmus fuscus	Greenbrier Cave Beetle
Pseudanophthalmus hadenoecus	Timber Ridge Cave Beetle
Pseudanophthalmus hypertrichosis	Martha's Cave Beetle
Pseudanophthalmus montanus	Dry Fork Valley Cave Beetle
Pseudosinella certa	Gandy Creek Cave Springtail
Pseudosinella fonsa	Cave Springtail
Pseudosinella gisini	A Springtail
Pyrgus wyandot	Grizzled Skipper
Sinella agna	A Springtail
Speyeria diana	Diana Fritillary
Crustaceans	
Caecidotea cannula	Cannulate Cave Isopod
Caecidotea holsingeri	Holsinger's Cave Isopod
Caecidotea sinuncus	A Cave Isopod
Caecidotea stygia	A Cave Isopod
Cambarus elkensis	Elk River Crayfish
Rheocyclops indiana	Indiana Groundwater Copepod
Bivalves	
Alasmidonta marginata	Elktoe
Lasmigona subviridis	Green Floater
Gastropods	
Fontigens tartarea	Organ Cavesnail
Other Invertebrates	
Apochthonius paucispinosus	Dry Fork Valley Cave Pseudoscorpion
Phagocata angusta	A Cave Obligate Planarian
Pseudotremia lusciosa	Germany Valley Cave Millipede
Pseudotremia princeps	South Branch Valley Cave Millipede
Sphalloplana culveri	Culver's Planarian
Stygobromus culveri	Culver's Cave Amphipod
Stygobromus emarginatus	Greenbrier Cave Amphipod
Stygobromus franzi	Franz's Cave Amphipod
Stygobromus nanus	Pocahontas Cave Amphipod
Stygobromus parvus	Minute Cave Amphipod
Trichopetalum weyeriensis	Grand Caverns Blind Cave Millipede
Trichopetalum whitei	Luray Caverns Blind Cave Millipede
Hesperochernes mirabilis	Southeastern Cave Pseudoscorpion
Plants	
Agrostis mertensii	Northern Bentgrass
Allium allegheniense	Allegheny Onion
Allium oxyphilum	Lillydale Onion
Amelanchier bartramiana	Bartram Shadbush
Arabis patens	Spreading Rock-cress
Astragalus distortus var. distortus	Ozark Milkvetch

Species	Common Name
Astragalus neglectus	Cooper's Milkvetch
Baptisia australis var. australis	Blue Wild Indigo
Botrychium lanceolatum var. angustisegmentum	Lanceleaf Grapefern
Carex lucorum var. austrolucorum	Blue Ridge Sedge
Carex roanensis	Roan Mountain Sedge
Clematis occidentalis var. occidentalis	Western Blue Virginsbower
Corallorhiza bentleyi	Bentley's Coralroot
Cornus rugosa	Roundleaf Dogwood
Cypripedium reginae	Showy Lady's Slipper
Delphinium exaltatum	Tall Larkspur
Eriogonum alleni	Shale Barren Buckwheat
Erysimum capitatum var. capitatum	Sanddune Wallflower
Euphorbia purpurea	Darlington's Glade Spurge
Gaylussacia brachycera	Box Huckleberry
Gymnocarpium appalachianum	Appalachian Oak Fern
Hasteola suaveolens	False Indian Plantain
Heuchera alba	White Alumroot
Hexalectris spicata	Crested Coralroot
Hypericum mitchellianum	Blue Ridge St. John's-wort
Ilex collina	Long-stalk Holly
Juglans cinerea	Butternut
Juncus filiformis	Thread Rush
Juncus trifidus	Highland Rush
Liatris turgida	Turgid Blazing Star
Linnaea borealis ssp. americana	Twinflower
Linum sulcatum	Grooved Yellow Flax
Listera cordata	Heartleaf Twayblade
Marshallia grandiflora	Monongahela Barbara's-buttons
Menyanthes trifoliata	Bog Buckbean
Monarda fistulosa ssp. brevis	Smoke Hole Bergamot
Ophioglossum engelmannii	Limestone Adder's-tongue
Paronychia argyrocoma	Silvery Nailwort
Paronychia virginica	Yellow Nailwort
Paxistima canbyi	Canby's Mountain-lover
Pedicularis lanceolata	Swamp Lousewort
Phlox buckleyi	Swordleaf Phlox
Piptatheropsis canadensis	Canadian Ricegrass
Platanthera shriveri	Shriver's Purple Fringed Orchid
Poa paludigena	Bog Bluegrass
Polemonium vanbruntiae	Bog Jacob's-ladder
Potamogeton tennesseensis	Tennessee Pondweed
Pycnanthemum beadlei	Beadle's Mountainmint
Ranunculus pensylvanicus	Pennsylvania Buttercup
Rhamnus lanceolata ssp. lanceolata	Lanceleaf Buckthorn
Ribes lacustre	Bristly Black Currant
Rosa blanda var. blanda	Smooth Rose
Rubus pubescens var. pubescens	Dwarf Red Blackberry
Saxifraga michauxii	Michaux's Saxifrage
Scutellaria saxatilis	Rock Skullcap
Silene virginica var. robusta	Fire Pink
Stachys aspera	Hyssopleaf Hedgenettle
Stellaria borealis ssp. borealis	Boreal Starwort
Taenidia montana	Mountain Pimpernel

Species	Common Name
Taxus canadensis	Canada Yew
Tofieldia glutinosa	Sticky Tofieldia
Trichomanes boschianum	Bristle Fern
Trichostema setaceum	Narrow-leaved Blue-curls
Trifolium virginicum	Kate's Mountain Clover
Triphora trianthophora	Threebirds
Viburnum opulus L. var. americanum	American Cranberrybush
Viola appalachiensis	Appalachian violet
Vitis rupestris	Sand Grape
Woodwardia areolata	Netted Chainfern
Non-vascular Plants	
Tortula ammonsiana	Ammons' Tortula Moss

Monongahela National Forest

TE and RFSS Terrestrial Wildlife Potentially Impacted by Proposed Project Activities

Bats:

The presence of human-created noise can disrupt animal communication and cause damage to sensory cells of the inner ear, which can result in deafness. In addition interference by natural or mechanical means, can interfere with a bats ability to forage. There is also concern that the noise and vibration from these activities could disturb maternity roosts and hibernaculum. Two vulnerable and critical stages in these species life cycle. Time of year restrictions or buffers could be put in place to minimize potential disturbance. A more extensive literature review is needed to provide a full analysis of impacts and should be provided in the project BA/EA.

Bats potentially impacted by project activities:

Myotis leibii	Eastern Small-footed Myotis (RFSS)
Myotis lucifugus	Little Brown Myotis (RFSS)
Perimyotis subflavus	Tri-colored Bat (RFSS)
Myotis sodalist	Indiana Bat (Endangered)
Corynorhinus townsendii virginianus	Virginia Big-eared Bat (Endangered)
Myotis septentrionalis	Northern Long-eared Bat (Threatened)

Other RFSS Mammals:

Allegheny Woodrats are highly sensitive to disturbance and human related activities. Noise disturbance from aircraft would likely have a potential adverse impact on the species. A more extensive literature review is needed on the species and similar species in order to provide a full analysis of impacts and should be provided in the project BA/EA. There is little to no research done on the remaining RFSS mammals in relation to such activities and impacts from activities are unknown. However a more extensive literature review of similar species should be conducted and reflected in project BA/EA.

Neotoma magister	Allegheny Woodrat

Birds:

Aircraft related noise (to include sonic booms) can result in disturbance of breeding birds to include nest abandonment. Allowing activities to occur between April 1st and Aug 31st could result in the take (kill, harass, harm) of birds nesting. Ideally to result in a no take of these birds and to be consistent with The Migratory Bird Treaty Act, activities should occur between Sep 1st and March 31st. These time of year restrictions are recommended, unless activities can otherwise show that they would not result in a take. Analysis should be provided in the project BA/EA. The

Monongahela National Forest is also located on a major migration route, as this may increase the chance of a bird strike or bird mortality. This should be kept in mind when providing project analysis for the BA/EA.

RFSS Birds potentially impacted by project activities:

Accipiter gentilis	Northern Goshawk
Ammodramus henslowii	Henslow's Sparrow
Asio otus	Long-eared Owl
Contopus cooperi	Olive-sided Flycatcher
Falco peregrinus anatum	American Peregrine Falcon
Haliaeetus leucocephalus	Bald Eagle
Lanius ludovicianus migrans	Migrant Loggerhead Shrike
Melanerpes erythrocephalus	Red-headed Woodpecker
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Setophaga cerulea	Cerulean Warbler
Setophaga discolor	Prairie Warbler
Vermivora chrysoptera	Golden-winged Warbler

T&E Inverts:

Potential impact (although unlikely) due to potential collision during low flying activities. Time of year restriction could mitigate impacts.

Bombus affinis	Rusty-patched Bumble Bee (Endangered)

RFSS Inverts:

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Brachionycha borealis	Boreal Fan Moth
Calephelis borealis	Northern Metalmark
Callophrys irus	Frosted Elfin
Cicindela ancocisconensis	Appalachian Tiger Beetle
Cicindela patruela	Northern Barrens Tiger Beetle
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Polygonia faunus smythi	Smyth's Green Comma
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Monongahela National Forest

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